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THE
TUTOR's ASSISTANT:
BEING
A Compendium of Arithmetic.
AND
A COMPLETE QUESTION-BOOK.

In FIVE PARTS.

CONTAINING,

I. *Arithmetic* in whole Numbers; being a brief Explanation of all its Rules, in a new and more conciſe Method than any hitherto publiſhed; with an *Application* to each Rule, conſiſting of a large Variety of Queſtions in real Buſineſs, with their Anſwers annexed.

II. *Vulgar Fractions*, which are treated with a great deal of Plainneſs and Perſpicuity.

III. *Decimals*, with the *Extraction* of the *Square, Cube*, and *Biquadrate Roots*, after a very plain and Familiar Manner; in which are ſet down *Rules* for the eaſy Calculation of *Intereſt*, *Annuities*, and *Penſions* in *Arrears*, the *preſent Worth* of *Annuities*, &c. either by Simple or Compound Intereſt.

IV. *Duodecimals* or *Multiplication* of Feet and Inches, with Examples applied to meaſuring, and working, by Multiplication, Practice, and Decimals.

V. A *Collection* of *Queſtions* ſet down promiſcuouſly, for the greater Trial of the foregoing *Rules*.

The whole being adapted either as a QUESTION BOOK for the Uſe of Schools, or as a REMEMBRANCER and INSTRUCTOR to ſuch as have ſome Knowledge therein.

This Work having been peruſed by ſeveral Eminent MATHEMATICIANS *and* ACCOUNTANTS, *is recommended as the beſt* COMPENDIUM *hitherto publiſhed for the Uſe of* SCHOOLS *or for* PRIVATE PERSONS.

The EIGHTH EDITION, *with ſeveral* ADDITIONS, particularly a *New* and very *ſhort Method* of extracting the CUBE ROOT, and a General TABLE for the *ready Calculating* the INTEREST *of any Sum of Money*, *at any Rate* per Cent. *likewiſe* Rents, Salaries, &c.

By FRANCIS WALKINGAME,
WRITING-MASTER and ACCOMPTANT.

Printed for the AUTHOR.
And ſold by EDWARD JOHNSON, in *Ave-Mary-Lane*, (Succeſſor to the late Mr. DOD) and F. WALKINGAME, in St. *Martin's-Lane*, near *Charing-Croſs*. 1770.

BRITISH MUSEUM

[redacted]

1773

PREFACE.

THE Public, no doubt, will be ſurprized to find there is another Attempt made to publiſh a Book of ARITHMETIC, when there are ſuch Numbers already extant on the ſame Subject, and ſeveral of them that have ſo lately made their Appearance in the World; but, I flatter myſelf, that the following Reaſons which induced me to compile it, the Method, and the Conciſeneſs of the Rules, which are laid down in ſo plain and familiar a Manner, will have ſome Weight towards its having a favourable Reception.

Having ſome Time ago drawn up a ſet of Rules, and proper Queſtions, with their Anſwers annexed, for the Uſe of my own School, and divided them into ſeveral Books, as well for the more Eaſe of myſelf, as the readier Improvement of my Scholars, I found them, by Experience, of finite Uſe; for, when a Maſter takes upon him laborious (though unneceſſary) Method of writing out the Rules and Queſtions in the Children's Books, he muſt either be toiling and ſlaving himſelf, after the Fatigue of the School is over, to get ready the Books for the next Day, or elſe muſt loſe that Time which would be much better ſpent in inſtructing and opening the Minds of his Pupils. There was, however, ſtill an Inconvenience which hindered them from giving me the Satisfaction I at firſt expected, *i. e.* where there are ſeveral Boys in a Claſs, ſome one or other muſt wait till the Boy who firſt has the Book, finiſhes the writing out thoſe Rules or Queſtions he wants, which detains the others from making that Progreſs they otherwiſe might, had they a proper Book of Rules and Examples for each; to remedy which, I was prompted to compile one, in order to have it printed, as might not only be of Uſe to my own School, but to ſuch others as would have their Scholars make a quick Progreſs. It will alſo be of great Uſe to ſuch Gentlemen as have acquired ſome Knowledge of Numbers at School, to make them the more perfect; likewiſe to ſuch as have completed themſelves therein, it will prove, after an impartial Peruſal, on Account of its great Variety and Brevity, a moſt agreeable and entertaining Exerciſe Book. I ſhall not preſume to ſay any Thing more in Favour of this Work, but beg Leave to refer the unprejudiced Reader to the Remark of a certain * Author, concerning Compoſitions of this Nature. His Words are as follows:

---

* *Dilworth.*

“ And now, after all, it is poſſible that ſome
“ who like beſt to tread the old beaten Path,
“ and to ſweat at their Buſineſs, when they may
“ do it with Pleaſure, may ſtart an Objection a-
“ gainſt the Uſe of this well-intended ASSISTANT,
“ becauſe the Courſe of ARITHMETIC is always
“ the ſame; and therefore, ſay, *That ſome Boys,*
“ *lazily inclined, when they ſee another at work*
“ *upon the ſame Queſtion, will be apt to make his*
“ *operation paſs for their own.* But theſe little
“ Forgeries are ſoon detected by the Diligence of
“ the TUTOR: Therefore, as different Queſtions
“ to different Boys do not in the leaſt promote
“ their Improvement; ſo neither do the Queſ-
“ tions hinder it. Neither is it in the Power of
“ any Maſter (in the Courſe of his Buſineſs) how
“ full of Spirits ſoever he be, to frame new Queſ-
“ tions at Pleaſure, in any Rule, but the ſame
“ Queſtion will frequently occur in the ſame
“ Rule, notwithſtanding his greateſt Care and
“ Skill to the contrary.

“ It may alſo be further objected, *That to*
“ *teach by a printed Book is an Argument of Ig-*
“ *norance and Incapacity*; which is no leſs trifle-
“ ing than the former. He, indeed, (if any ſuch
“ there be) who is afraid his Scholars will im-
“ prove too faſt, will, undoubtedly, decry this
“ Method: But that Maſter's Ignorance can ne-
“ ver be brought in Queſtion, who can begin
“ and end it readily; and, moſt certainly, that
“ Scholar's Non-Improvement can be as little

" queſtioned, who makes a much greater Pro-
" greſs by this than by the common Method."

To enter into a long Detail of every Rule would tire the Reader, and ſwell the Preface to an unuſual Length; I ſhall therefore, only give a general Idea of the Method of Proceeding, and leave the reſt to ſpeak for itſelf; which, I hope, the kind Reader will find to anſwer the Title, and the Recommendation given it. As to the Rules, they follow in the ſame Manner as the Table of Contents ſpecifies, and in much the ſame Order as they are generally taught in Schools. I have gone through the four fundamental Rules in Integers firſt, before thoſe of the ſeveral Denominations, in order that they being well underſtood, the latter will be performed with much more Eaſe and Diſpatch, according to the Rules ſhewn, than by the cuſtomary Method of dotting. In Multiplication I have ſhewn both the Beauty and Uſe of that excellent Rule, in reſolving moſt Queſtions that occur in merchandizing; and have prefixed before Reduction, ſeveral Bills of Parcels, which are applicable to real Buſineſs. In working Intereſt by Decimals, I have added Tables to the Rules, for the readier calculating Annuities, *&c.* and have not only ſhewn the Uſe, but the Method of making them. I have alſo added to this *Edition* a NEW RULE for extracting the *Cube Root*, being a much ſhorter Way than any that is already publiſhed; as likewiſe an Intereſt-Table calculated for the eaſier finding the Intereſt of any Sum of Money at any Rate *per Cent.* by Multiplication and Addition only; it is alſo uſeful in calculating Rents, Incomes, and Servant's Wages, for any Number of Months, Weeks, or Days; and, I may venture to ſay, I have gone through the Whole with ſo much Plainneſs and Perſpicuity, that there is none better extant.

I have nothing further to add, but a Return of my ſincere Thanks to all thoſe Gentlemen, Schoolmaſters, and others, whoſe kind Approbation and Encouragement hath now eſtabliſhed the Uſe of this Book in almoſt every School of Eminence throughout the Kingdom: But I think my Gratitude more eſpecially due to thoſe who have favoured me with their Remarks; though, I muſt ſtill beg of every candid and judicious Reader, that if he ſhould, by Chance, find a Tranſpoſition of a Letter, or a Falſe Figure, to excuſe it; for, notwithſtanding there has been great Care taken in correcting, yet Errors of the Preſs will inevitably creep in, and ſome may alſo have ſlipped my Obſervation: In either of which Caſes, the Admonitions of a good-natured Reader will be very acceptable to his

much obliged,

and moſt obedient

humble Servant,

St. Martin's-Lane,
Feb. 6, 1770.

F. WALKINGAME.

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WRITING,

In all the various Hands now in Uſe;

ARITHMETIC,

Through all its different Rules;

VULGAR and DECIMAL FRACTIONS,

With the EXTRACTION of the

SQUARE and CUBE ROOT;

ALSO

DUODECIMALS;

Are taught Abroad,

By F. WALKINGAME,

In *St.-Martin's-Lane*, near *Charing-Croſs*.

Where may be had, *The* TUTOR'S ASSISTANT.

Explanation *of the* Characters *made uſe of in this* COMPENDIUM.

$=$ *Equal.*	The Sign of Equality; as, 4 *qrs.* $=$ 1 *cwt.* ſignifies, that 4 *qrs.* are equal to 1 *cwt.*
$-$ *Minus, or leſs.*	The Sign of Subtraction; as, $8 - 2 = 6$, that is, 8 leſſened by 2 is equal to 6.
$+$ *Plus, or more.*	The Sign of Addition; as, $4+4=8$, that is, 4 add 4 more, is equal to 8.
$\times$ *Into, or with.*	The Sign of Multiplication; as, $4\times 6=24$; that is, 4 multiplied into 6, is equal to 24.
$\div$ *By*	The Sign of Diviſion; as, $8\div 2=4$, that is, 8 divided by 2 is equal to 4.
$\frac{2375}{63}$	Numbers placed like a Fraction, do likewiſe denote Diviſion; the upper Number being the Dividend, and the lower the Diviſor.
$: :$ *So is.*	The Sign of Proportion; as, $2 : 4 : : 8 : 16$; that is, as 2 is to 4 ſo is 8 to 16.
$7-2+5=10$.	Shews that the Difference between 2 and 7 added to 5, is equal to 10.
$9-\overline{2+5}=2$.	Signifies, that the Sum of 2 and 5 taken from 9, is equal to 2.
$\sqrt{}$	Prefixed to any Number, ſignifies the Square Root of that Number is required.
$\sqrt[3]{}$	Signifies the Cube, or third Power.
$\sqrt[4]{}$	Denotes the Biquadrate, or the fourth Power, &c.

THE
TUTOR's ASSISTANT,
BEING
A Compendium of Arithmetic.

PART I.

Arithmetic in Whole Numbers.

The INTRODUCTION.

ARITHMETIC is the Art or Science of computing by Numbers, and conſiſts both in Theory
d Practice.

The Theory conſiders the Nature and Quality of Num-
ers, and demonſtrates the Reaſon of practical Operations.

The Practice is that which ſhews the Method of work-
g by Numbers, ſo as to be the moſt uſeful and expedi-
ous for Buſineſs, and has five principal or fundamental
ules for the Operations: *viz.*

Notation or Numeration, Addition, Subtrac-
ion, Multiplication and Division.

NUMERATION

TEACHETH the different Value of Figures by their different Places, and to read and write any
um or Number.

The TABLE.

C Millions.	X Millions.	Millions.		C Thouſands.	X Thouſands.	Thouſands.		Hundreds.	Tens.	Units.
9	8	7	.	6	5	4	.	3	2	1
9	0	0	.	0	0	0	.	0	0	0
	8	0	.	0	0	0	.	0	0	0
		7	.	0	0	0	.	0	0	0
				6	0	0	.	0	0	0
					5	0	.	0	0	0
						4	.	0	0	0
								3	0	0
									2	0
										1

RULE. There are three Periods; the firſt, on the Right-hand, Units; the Second, Thouſands; and the Third, Millions, each conſiſting of three Figures or Places. Reckon the firſt Figure of each from the Left Hand as ſo many Hundreds; the next as Tens, and the Third as ſo many ſingle Ones of what is wrote over them: As the firſt Period on the Left Hand is read thus, Nine Hundred Eighty-ſeven Millions; and ſo on for any of the reſt.

The APPLICATION.

Write down in proper Figures the following Numbers.

Twenty-three.

Two Hundred and Fifty-four

Three Thouſand, two Hundred and Four.

Twenty-five Thouſand, Eight Hundred Fifty-ſix.

One Hundred Thirty-two Thouſand, two Hundred Forty-five.

Four Millions, nine hundred forty-one Thouſand, four Hundred.

Twenty-ſeven Millions, one hundred fifty-ſeven Thouſand, eight Hundred thirty-two.

Seven hundred twenty-two Millions, two hundred thirty-one thouſand, five Hundred and Four.

Six hundred two Millions, two hundred ten Thouſand, five Hundred.

Write down in Words at Length the following Numbers.

35
59
173

2017
5201
20760

519007
750058
5900030

5207054
2071906
70054008

65700047
900062057
201900760

Notation by ROMAN *Letters.*

I One.
II Two.
III Three
IV Four.
V Five.
VI Six.
VII Seven
VIII Eight
IX Nine
X Ten.
XI Eleven.
XII Twelve.
XIII Thirteen.
XIV Fourteen.
XV Fifteen.
XVI Sixteen.
XVII Seventeen.
XVIII Eighteen.
XIX Nineteen.
XX Twenty.

XXX Thirty.
XL Forty.
L Fifty
LX Sixty.
LXX Seventy.
LXXX Eighty.
XC Ninety.
C Hundred.
CC Two Hundred.
CCC Three Hundred.
CCCC Four Hundred.
D Five Hundred.
DC Six Hundred.
DCC Seven Hundred.
DCCC Eight Hundred.
DCCCC Nine Hundred.
M One Thouſand.
MDCCLXX One Thouſand, Seven Hundred and Seventy.

INTEGERS.

ADDITION

TEACHETH to add two or more Sums together, to make one whole or total Sum.

RULE. There muſt be due Regard had in placing your Figures one under the other, *i. e.* Units under Units, Tens under Tens, *&c.* then beginning with the firſt row of Units, add them up to the Top; when done, ſet down the Units, and carry the Tens to the next, and ſo on; continuing to the laſt Row, at which ſet down the total Amount.

PROOF. Begin at the Top of the Sum, and reckon the Figures downwards, the ſame as you added them up, and, if the ſame as the Firſt, the Sum is ſuppoſed to be right.

ADDITION *and* SUBTRACTION TABLE.

1	2	3	4	5	6	7	8	9
2	4	5	6	7	8	9	10	11
3	5	6	7	8	9	10	11	12
4	6	7	8	9	10	11	12	13
5	7	8	9	10	11	12	13	14
6	8	9	10	11	12	13	14	15
7	9	10	11	12	13	14	15	16
8	10	11	12	13	14	15	16	17
9	11	12	13	14	15	16	17	18

£.	*Cwt.*	*Qrs.*	*Months.*	*£.*	*Years.*
2	27	275	1234	7524	27104
5	35	110	7098	3750	32547
7	47	473	3214	9147	10738
9	35	354	6732	3214	62590
2	41	271	2546	4725	75408
5	36	352	3709	2147	27973
4	59	471	4152	3254	85421
3	37	310	3705	2716	12706
7	14	473	1076	1047	10471
44	331				

SUBTRACTION

TEACHETH to take a leſſer Number from greater, and ſhews the Remainder, or Difference.

RULE. This being the Reverſe of Addition, you muſ borrow here (if it requires) what you ſtopped at there, always remembering to pay it to the next.

PROOF. Add the Remainder and leſſer Line together and, if the ſame as the greater, it is right.

	£.	*Hund.*	*Hours.*	*Weeks.*	*Hogds.*	*Minute*
From	271	3754	42087	452705	271508	375021
Take	154	2725	35096	327616	152471	215087
Rem.	117					
Rroof.	271					

MULTIPLICATION

TEACHETH how to encreaſe the greater of two Numbers given, as often as there are Units in the leſſer; and compendiouſly performs the Office of many Additions.

To this Rule belong three principal Members: *viz.*

1. The Multiplicand, or Number to be multiplied.
2. The Multiplier, or Number by which you multiply.
3. The Product, or Number produced by multiplying.

Rule. Begin with that Figure that ſtands in the Units Place of the Multiplier, and with it multiply the firſt Figure in the Units Place of the Multiplicand. Set down the Units, and carry the Tens in Mind, till you have multiplied the next Figure in the Multiplicand by the ſame Figure in the Multiplier; to the Product of which add the Tens you kept in Mind, ſetting down the Units, and proceed as before, till the whole Line is multiplied.

Proof. The uſual Way of proving Multiplication is, by caſting out the Nines from the Multiplicand and Multiplier; the Remainders put on each Side of a Croſs: Multiply the Figures on each Side together, caſt the Nines from the Product, and put the Overplus at Top; then caſt out the Nines from the Product of the Multiplication, and its Remainder place at the Bottom; and if it agrees with the Top, the Work is ſuppoſed right. But the ſureſt Way is, to divide the Product by the Multiplicand, and the Quotient will be the ſame as the Multiplier.

Multiplication *and* Division TABLE.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

Multiplicand	25104736	52471021	79254375
Multiplier	2	3	
Product	50209472		

27104107	231047	7092516	37251
5	6	7	

3215406	2701047	31040871	3521047
9	11	12	

When the Multiplier is more than 12, and leſs than 20 multiply by the Unit Figure in the Multiplier, adding the Product the back Figure to that you multiplied.

5710592	5107252	7653210	9205716
13	14	15	

6251721	9215324	2571041	35921
17	18	19	

When the Multiplier conſiſts of ſeveral Figures, the muſt be as many Products as there are Figures in the Mu tiplier, obſerving to put the firſt Figure of every Produ under that Figure you multiplied by. Add the ſever Products together, and their Sum will be the total Pr duct.

271041	32104	2710432	275019
27	25	375	2
1897287	802620	1016412000	74530354
542082			
7318107			

When Cyphers are placed between the ſignificant F gures in the Multiplier, they may be omitted, but gre Care muſt be taken that the next Figure muſt be put o Place more to the Left Hand, *i. e.* under the Figure y multiply by.

5712

571204	7104325	5271094
27009	57020	590030
15427648836	405088611500	3110103592820

When there are Cyphers at the End of the Multiplicand or Multiplier, they may be omitted, by only multiplying by the reſt of the Figures, and ſetting down on the Right-hand of the total Product as many Cyphers as were omitted.

27100	379500	265000	574000
52600	274000	7200	630
1425460000	103983000000	1908000000	361620000

When the Multiplier is a compoſite Number, *i. e.* if any two Figures, being multiplied together, will make that Number, then multiply by one of thoſe Figures, and that Product by the other will give the Anſwer.

571039 by 35	921563 by 32	715241 by 56
19986365	29490016	40053496

DIVISION

TEACHETH us to find how often one Number is contained in another; or to divide any Number into what Parts you pleaſe.

In this Rule there are three Numbers real, and a fourth accidental, *viz.*

1. The Dividend, or Number to be divided.
2. The Diviſor, or Number by which you divide.
3. The Quotient, or Number that ſhews how often the Diviſor is contained in the Dividend.

4th, or accidental Number, is what remains when the Work is finiſhed, and is of the ſame Name as the Dividend.

RULE. When the Diviſor is leſs than 12, find how often it is contained in the firſt Figure of the Dividend; ſet it down under the Figure you divided, and carry the Overplus (if any) to the next in the Dividend, as ſo many Tens; then find how often the Diviſor is contained therein, ſet it down, and continue the ſame till you have gone through the

the line: but when the Diviſor is more than 12, multiply it by the Quotient Figure; the Product ſubtract from the Dividend, and to the Remainder bring down the next Figure in the Dividend, and proceed as before, till the Figures are all brought down.

Proof. Multiply the Diviſor and Quotient together, adding the Remainder (if any) and the Product will be the ſame as the Dividend.

Dividend Rem.
Diviſor 2)725107(1
Quotient 362553
2
Proof 725107

3)7210472(
4)7210416(
5)7203287(
6)5231047(
7)2532701(
8)2547325(
9)25047306(
11)2750012(
11)2710513(
12)72100732(

Diviſor Dividend Quotient
29)4172377(143875
29
127
116
112
87
253
232
217
203
147
145
Rem 2

143875
29
1294875
287750
2
4172377 Proof

37)7210473(194877
473)2104721(4449
275)3720147(13527
3701)72109521(19483
3576)72104725(20163
2510)632104760(25183
25204)3210472217(12737
31709)5210473321(16432
2701234)7210472532(2669
210472)352107193214(1672940
3721071)21071921473(5662

When

When there are Cyphers at the End of the Diviſor, they may be cut off, and as many Places off of the Dividend, but muſt be annexed to the Remainder at laſt.

275|00)254732|21(939 5721|00)7253472|16(1267
373|000)752473|719(2006 215|000)6325104|997(29419

When the Diviſor is a compoſite Number, *i. e.* if any two Figures, being multiplied together, will make that Number; then divide the Dividend by one of thoſe Figures, and that Quotient by the other, it will give the Quotient required.—But as it ſometimes happens, that there is a Remainder to each of the Quotients, and neither of them the true one, it may be found by this

RULE. Multiply the firſt Diviſor into the laſt Remainder, to that Product add the firſt Remainder, which will give the true one,

Div. 3210473 by 27	7210473 by 35	6251043 by 42	5761034 by 54
118906.11 Rem.	206013.18 Rem.	148834.15 Rem.	106685.44 Rem.

TABLES *of* MONEY, WEIGHTS *and* MEASURES.

MONEY.

Marked			Marked
$\frac{1}{4}$	*Farthing.*	4 Farthings - make 1 Penny. -	*d.*
$\frac{1}{2}$	*Halfpenny.*	12 Pence - - - - 1 Shilling -	*s.*
$\frac{3}{4}$	*Three Farthings.*	20 Shillings - - - 1 Pound. -	*l.*

Farthings.
4 = 1 Penny.
48 = 12 = 1 Shilling.
960 = 240 = 20 = 1 Pound.

TROY WEIGHT.

	Marked
24 Grains - - make - - - 1 Pennyweight. - -	*grs.* *dwts.*
20 Pennyweights - - - - - 1 Ounce. - - - -	*oz.*
12 Ounces - - - - - - - - - 1 Pound. - - - - - -	*lb.*

Grains.
24 = 1 Pennyweight.
480 = 20 = 1 Ounce.
5760 = 240 = 12 = 1 Pound.

By this Weight are weighed Gold, Silver, Jewels, Electuaries, and all Liquors.

N. B.

N. B. The Standard for Gold Coin is 22 Carats of fi Gold, and 2 Carats of Copper melted together. For Silv is 11 *oz.* 2 *dwts.* of fine Silver, and 18 *dwts.* of Copper.

25 *lb.* is a Quarter of an *cwt.* 100 *l.* 1 *cwt.* 20 *cw*
1 Ton of Gold or Silver.

AVOIRDUPOISE WEIGHT.

			Mark
16 Drams	make	1 Ounce	*dr.* *oz.*
16 Ounces		1 Pound.	*lb.*
28 Pounds		1 Quarter.	*qrs.*
4 Quarters, or 112 *lb.*		1 Hundred Weight.	*cw*
20 Hundred Weight		1 Ton.	*To*

Drams.
16 = 1 Ounce.
256 = 16 = 1 Pound.
7168 = 448 = 28 = 1 Quarter.
28672 = 1792 = 112 = 4 = 1 Hundred Weigh
573440 = 35840 = 2240 = 80 = 20 = 1 Ton.

There are ſeveral other Denominations in this Weigh that are uſed in ſome particular Goods, *viz.*

	lb.		*lb*
A Firkin of Butter	56	A Stone of Iron Shot, or Horſeman's wt.	14
Soap	64		
A Barrel of Anchovies	30	Butcher's Meat	
Soap	256	A Gallon of Train Oil	
Raiſins	112	A Truſs of Straw	3
A Puncheon of Prunes	1120	New Hay	6
A Fother of Lead, 19 *cwt.* 2 *qrs.*		Old Hay	5
		36 Truſſes a Load.	

Cheeſe and Butter.

A Clove, or Half Stone, 8 *lb.*

	lb.		*lb.*
A Wey in Suffolk, 32 Cloves, or	256	A Wey in Eſſex 42 Cloves, or	33

Wool.

	lb.		*lb.*
A Clove	7	A Wey is 6 Tod and 1 Stone, or	18
A Stone	14	A Sack is 2 Weys, or	3
A Tod	28	A Laſt is 12 Sacks, or	43

By this Weight is weighed any Thing of a coarſe or droſſy ture; as all Grocery and Chandlery Wares; Bread and Metals but Silver and Gold.

Note, 1 Pound Avoirdupoiſe is equal to 14 *oz.* 11 *dwts.* 15 *gr.* ½ Troy.

APOTHECARIES WEIGHT.

			Marked
20 Grains	make	1 Scruple.	℈
3 Scruples		1 Dram.	ʒ
8 Drams		1 Ounce.	℥
12 Ounces		1 Pound.	℔

Grains.
20 = 1 Scruple.
60 = 3 = 1 Dram.
480 = 24 = 8 = 1 Ounce.
5760 = 288 = 96 = 12 = 1 Pound.

Note, The Apothecaries mix their Medicines by this Rule, but buy and ſell their Commodities by Avoirdupoiſe Weight.

The Apothecaries Pound and Ounce, and the Pound and Ounce Troy are the ſame, only differently divided and ſubdivided.

CLOTH MEASURE.

			Marked
4 Nails	make	1 Quarter of a Yard.	*n.* *qrs.*
3 Quarters		1 Flemiſh Ell.	*F. E.*
4 Quarters		1 Yard.	*yd.*
5 Quarters		1 Engliſh Ell.	*E. E.*
6 Quarters		1 French Ell.	*Fr. E.*

Inches.
2¼ = 1 Nail.
9 = 4 = 1 Quarter.
36 = 16 = 4 = 1 Yard.
27 = 12 = 3 = 1 Flemiſh Ell.
45 = 20 = 5 = 1 Engliſh Ell.

LONG MEASURE.

			Marke
3	Barley Corns make	1 Inch	*bar.* *in.*
12	Inches	1 Foot.	*feet.*
3	Feet	1 Yard.	*yd.*
6	Feet	1 Fathom.	*fath.*
5½	Yards	1 Rod, Pole, or Perch.	*rod. p*
40	Poles	1 Furlong	*fur.*
8	Furlongs	1 Mile.	*mile.*
3	Miles	1 League.	*lea.*
60	Miles	1 Degree.	*deg.*

Barley-Corns.
3 = 1 Inch.
36 = 12 = 1 Foot.
108 = 36 = 3 = 1 Yard.
594 = 198 = 16½ = 5½ = 1 Pole.
23760 = 7920 = 660 = 220 = 40 = 1 Furlong.
190080 = 63360 = 5280 = 1760 = 320 = 8 = 1 Mile.

N. B. A Degree is 69 Miles, 4 Furlongs, very near, tho' commonly reckoned but 60 Miles.

This Rule is uſed to meaſure Diſtance of Places, or any Thing elſe that has Length only.

WINE MEASURE.

			Marked
2	Pints make	1 Quart.	*pt.* *qts.*
4	Quarts	1 Gallon.	*gal.*
10	Gallons	1 Anchor of Brandy.	*anc.*
18	Gallons	1 Runlet	*run.*
31½	Gallons	Half an Hogſhead.	½ *hhd.*
42	Gallons	1 Tierce.	*tierce.*
63	Gallons	1 Hogſhead.	*hhd.*
2	Hogſheads	1 Pipe, or Butt.	*P.* or *Butt*
2	Pipes, or 4 Hogſheads	1 Tun.	*tun.*

Inche

Cubic Inches
$28\frac{7}{8}$ = 1 Pint.
$57\frac{3}{4}$ = 2 = 1 Quart.
231 = 8 = 4 = 1 Gallon.
9702 = 336 = 168 = 42 = 1 Tierce.
14553 = 504 = 252 = 63 = $1\frac{1}{2}$ = 1 Hogſhead.
19404 = 672 = 336 = 84 = 2 = $1\frac{1}{3}$ = 1 Puncheon.
29106 = 1008 = 504 = 126 = 3 = 2 = $1\frac{1}{2}$ = 1 Pipe.
58212 = 2106 = 1008 = 252 = 6 = 4 = 3 = 2 = 1 Tun.

All Brandies, Spirits, Perry, Cyder, Mead, Vinegar, Honey and Oil, are meaſured by this meaſure; as alſo Milk: Not by Law but Cuſtom only.

ALE *and* BEER MEASURE.

				Marked
2	Pints - - make - - - -	1	Quart. - - - - - -	*pts.* *qts.*
4	Quarts - - - - - - - - - - -	1	Gallon - - - - - - - -	*gal.*
8	Gallons - - - - - - - - - -	1	Firkin of Ale - - -	*A. fir*
9	Gallons - - - - - - - - - -	1	Firkin of Beer - -	*B. fir*
2	Firkins - - - - - - - - - - -	1	Kilderkin - - - - -	*Kil*
4	Firkins, or 2 Kilderkins	1	Barrel - - - - - - -	*Bar*
1	Barrel and $\frac{1}{2}$, or 54 Gallons	1	Hogſhead of Beer -	*hh*
3	Barrels, or 2 Hogſheads -	1	Butt - - - - - - - - -	*But*

BEER.

Cubic Inches.
$35\frac{1}{4}$ = 1 Pint.
$70\frac{1}{2}$ = 2 = 1 Quart.
282 = 8 = 4 = 1 Gallon.
2538 = 72 = 36 = 9 = 1 Firkin.
5076 = 144 = 72 = 18 = 2 = 1 Kilderkin.
10152 = 288 = 144 = 36 = 4 = 2 = 1 Barrel.
15228 = 432 = 216 = 54 = 6 = 3 = $1\frac{1}{2}$ = 1 Hogſhead.
30456 = 864 = 432 = 108 = 12 = 6 = 3 = 2 = 1 Butt.

ALE.

Cubic Inches.
$35\frac{1}{4}$ = 1 Pint.
$70\frac{1}{2}$ = 2 = 1 Quart.
282 = 8 = 4 = 1 Gallon.
2256 = 64 = 32 = 8 = 1 Firkin.
4512 = 128 = 64 = 16 = 2 = 1 Kilderkin
9024 = 256 = 128 = 32 = 4 = 2 = 1 Barrel.
13536 = 384 = 192 = 48 = 6 = 3 = $1\frac{1}{2}$ = 1 Hogſh.

In *London* they compute but 8 Gallons to the Firkin of Ale, and 32 to the Barrel; but in all other Parts of *England*, for Ale, Strong Beer, and Small, 34 Gallons to the Barrel, and 8 Gallons and ½ to the Firkin.

N. B. A Barrel of Salmon, or Eels, is 42 Gallons.
A Barrel of Herrings - - - - - - 32 Gallons.
A Keg of Sturgeon - - - - - - - - 4 or 5 Gallons.
A Firkin of Soap - - - - - - - - - 8 Gallons.

DRY MEASURE.

					Marked
2	Pints - - - make - -	1	Quart. - - -	{	*pts.* *qts.*
2	Quarts - - - - - - - - -	1	Pottle. - - - - - -		*pot.*
2	Pottles - - - - - - - - -	1	Gallon. - - - - -		*gal.*
2	Gallons - - - - - - - - -	1	Peck. - - - - - -		*pk.*
4	Pecks - - - - - - - - - -	1	Buſhel. - - - - -		*bu.*
2	Buſhels - - - - - - - - -	1	Strike. - - - - -		*ſtrike.*
4	Buſhels - - - - - - - - -	1	Coom. - - - - -		*coom.*
2	Cooms, or 8 Buſhels -	1	Quarter - - - - -		*qr.*
4	Quarters - - - - - - - -	1	Chaldron. - - - -		*chal.*
5	Quarters - - - - - - - -	1	Wey. - - - - - -		*wey.*
2	Weys - - - - - - - - - -	1	Laſt. - - - - - -		*laſt.*

In *London* 36 Buſhels make a Chaldron.

Solid Inches.
$268\frac{4}{5}$ = 1 Gallon.
$537\frac{3}{5}$ = 2 = 1 Peck.
$2150\frac{2}{5}$ = 8 = 4 = 1 Buſhel.
$4300\frac{4}{5}$ = 16 = 8 = 2 = 1 Strike.
$8601\frac{3}{5}$ = 32 = 16 = 4 = 2 = 1 Coom.
$17203\frac{1}{5}$ = 64 = 32 = 8 = 4 = 2 = 1 Quarter.
86016 = 320 = 160 = 40 = 20 = 10 = 5 = 1 Wey.
172032 = 640 = 320 = 80 = 40 = 20 = 10 = 2 = 1 Laſt.

The Buſhel in *Water Meaſure* is 5 Pecks.
A Score of Coals is 21 Chaldron.
A Sack of Coals - - 3 Buſhels.
A Load of Corn - - 5 Buſhels.
A Cart Load ditto - 40 Buſhels.

This Meaſure is applied to all dry Goods.

The Standard Buſhel is 18 Inches and ½ wide, and Inches deep.

TIME

T I M E.

		Marked
60 Seconds - - make - -	1 Minute. - - - -	″ *m.*
60 Minutes - - - - - - - -	1 Hour. - - - - - - -	*hour.*
24 Hours - - - - - - - - -	1 Day. - - - - - - -	*day.*
7 Days - - - - - - - - -	1 Week. - - - - - -	*week.*
4 Weeks - - - - - - - - -	1 Month. - - - - - -	*mo.*
13 Months, 1 Day, 6 Hours,	1 Julian Year. - - -	*yr.*

Seconds.
60 = 1 Minute.
3600 = 60 = 1 Hour.
86400 = 1440 = 24 = 1 Day.
604800 = 10080 = 168 = 7 = 1 Week.
2419200 = 40320 = 672 = 28 = 4 = 1 Month.
h d h
31557600 = 525960 = 8766 = 365.6 = 52.1.6 = 1 Julian Yr.
h m ″
31556937 = 525948 = 8765 = 365.5.48.57 = 1 Solar Year.

To know the Days in each Month, obſerve,

Thirty Days hath September,
April, June *and* November,
February *hath twenty-eight alone,*
All the reſt hath thirty and one ;
Except in Leap Year, *and then's the Time*
February's *Days are twenty and nine.*

SQUARE MEASURE.

144 Inches - - - make - - - - - -	1 Foot.
9 Feet - - - - - - - - - - - - - - -	1 Yard.
100 Feet - - - - - - - - - - - - - - -	1 Square of Flooring.
272¼ Feet - - - - - - - - - - - - - -	1 Rod.
40 Rods - - - - - - - - - - - - - -	1 Rood.
4 Roods, or 160 Rods, or 4840 Yards	1 Acre of Land.
640 Acres - - - - - - - - - - - - - -	1 Square Mile.
30 Acres - - - - - - - - - - - - - -	1 Yard of Land.
100 Acres - - - - - - - - - - - - - -	1 Hide of Land.

Inches.
144 = 1 Foot.
1296 = 9 = 1 Yard.
39204 = 272¼ = 30¼ = 1 Pole.
1568160 = 10890 = 1210 = 40 = 1 Rod.
6272640 = 43560 = 4840 = 160 = 4 = 1 Acre.

By this Meaſure are meaſured all Things that hav Length and Breadth; ſuch as Land, Painting, Plaiſtering Flooring, Thatching, Plumbing, Glazing, *&c.*

SOLID MEASURE.

1728 Inches - make - - - 1 Solid Foot.
27 Feet - - - - - - - - - 1 Yard, or Load of Earth.
40 Feet of Round Timber }
Or, 50 Feet of Hewn Timber } is 1 Ton, or Load.

108 Solid Feet, *i. e.* 12 Feet in Length, 3 Feet in Breadt and 3 deep; or, commonly, 14 Feet long, 3 Feet 1 Inc broad, and 3 Feet 1 Inch deep, is a Stack of Wood.

128 Solid Feet, *i. e.* 8 Feet long, 4 Feet broad, and Feet deep, is a Cord of Wood.

By this Meaſure are meaſured all things that hav Length, Breadth and Depth.

ADDITION *of* MONEY, WEIGHTS, *and* MEASURES.

RULE. Add the firſt Row or Denomination together as in Integers; then divide the Sum by as many o the ſame Denomination as make one of the next greater ſetting down the Remainder under the Row added, an carry the Quotient to the next ſuperior Denomination, continuing the ſame to the laſt, which add as in ſimple Addition

PROOF. As in Integers.

MONEY.

£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
2	13	5½	27	7	1	35	17	3	75	3	7
7	9	4¼	35	14	7¼	59	14	7½	54	17	1
5	15	4½	57	19	2¼	97	13	5¼	91	15	4
9	17	6¼	91	16	1	35	16	8¼	35	16	5
7	16	3	75	18	7¾	97	15	7	27	19	7
5	14	7¾	97	13	5	59	16	5½	91	17	3
39	6	7¼									

MONEY.

£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
257	1	4¼	525	2	4¼	21	14	7¼	73	2	1½
704	3	7¾	179	3	5	75	16	3	25	12	7
595	5	3	350	4	7¼	79	2	4¼	96	13	5½
059	13	7½	975	3	5¼	57	16	5½	76	17	3¼
207	5	4	254	5	7	26	13	8¾	97	14	1
798	16	7¾	379	4	5¾	54	2	7	54	13	7¾

£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
172	4	7¼	251	17	1¼	25	1	1½	27	13	5
325	3	5	379	13	5	76	13	1	15	7	9¼
271	0	7¾	257	16	7¾	34	19	7¼	9	15	3
524	9	1	184	13	5	97	17	3¼	15	2	7¼
379	4	3½	795	2	7¼	35	13	5	37	19	1
215	5	9¾	359	16	5¼	27	16	3	56	13	7¼

TROY WEIGHT.

oz.	dwt.	gr.	oz.	dwt.	gr.	lb.	oz.	dwt.	lb.	oz.	dwt.
7	15	21	5	11	4	7	1	2	5	2	15
3	17	6	7	19	21	3	2	17	3	11	17
2	5	14	3	15	14	5	1	15	9	7	15
3	16	19	7	19	22	7	10	11	4	5	13
9	18	23	9	18	15	2	7	14	3	9	7
7	15	14	8	13	12	3	11	18	5	2	15

AVOIRDUPOISE WEIGHT.

lb.	oz.	dr.	lb.	oz.	dr.	cwt.	qrs.	lb.	T.	cwt.	qrs.
159	15	15	17	12	3	25	1	17	7	17	2
72	14	10	23	15	6	79	3	26	5	5	3
03	15	11	31	11	14	54	1	16	2	4	–
55	10	4	97	–	9	24	3	16	3	18	2
73	6	2	48	7	15	07	–	19	7	9	3
35	13	13	79	10	6	55	2	16	8	5	1

APOTHECARIFS WEIGHT.

ʒ	℈	gr.	℥	ʒ	℈	gr.	lb.	℥	ʒ	℈	lb.	℥	ʒ	℈
7	1	17	9	2	–	17	7	10	7	1	7	2	1	-
3	–	18	3	5	2	19	9	5	2	2	3	1	7	1
6	2	16	9	2	1	14	7	11	1	2	9	10	2	-
5	1	15	3	5	–	18	9	5	6	1	7	5	7	1
7	–	18	7	7	2	15	7	10	5	2	3	9	5	2
3	1	5	9	3	–	—	9	—	3	–	7	1	4	1

CLOTH MEASURE.

E.F.	*qrs.*	*n.*	*yds.*	*qrs.*	*n.*	*yds.*	*qrs.*	*n.*	*E.E.*	*qrs.*	*n.*
27	2	1	35	3	2	75	3	2	76	2	1
15	1	3	76	2	3	97	1	3	52	1	2
37	–	2	95	3	–	54	–	2	79	–	1
52	1	3	76	1	3	76	2	–	56	2	-
76	2	1	26	–	1	59	1	3	79	3	1
97	1	3	79	2	1	76	2	2	54	2	1

LONG MEASURE.

feet.	*in.*	*bar.*	*yds.*	*f.*	*in.*	*m.*	*fur.*	*p.*	*lea.*	*m.*	*fur*
27	9	2	25	1	9	35	7	3	72	2	
35	10	1	71	–	3	27	5	27	27	1	
17	2	2	52	1	2	52	–	35	35	2	
35	11	1	97	–	10	97	1	17	79	–	
97	2	2	54	2	7	56	7	18	51	1	
54	8	1	37	1	4	91	5	27	72	–	

LAND MEASURE.

a.	*r.*	*p.*	*a.*	*r.*	*p.*	*a.*	*r.*	*p.*	*a.*	*r.*	
75	3	27	27	1	35	26	1	31	32	1	
36	2	15	29	2	16	19	2	17	27	–	
97	1	16	37	1	15	55	1	14	31	2	
35	2	15	95	2	27	79	3	21	19	1	
27	1	14	62	–	13	95	2	14	36	2	

WIN

WINE MEASURE.

run. gal. qts.	*tier. gal. qts.*	*hhds. gal. qts.*	*T. hhds. gal.*
27 .. 17 .. 2	25 .. 36 .. 2	31 .. 57 .. 1	14 .. 3 .. 27
35 .. 15 .. 3	75 .. 41 .. 3	97 .. 18 .. 2	19 .. 2 .. 56
56 .. 14 .. 1	62 .. 15 .. 1	76 .. 13 .. 1	17 .. – .. 39
97 .. 10 .. 3	94 .. 13 .. –	55 .. 46 .. 2	75 .. 2 .. 16
92 .. 15 .. –	15 .. 14 .. 1	87 .. 38 .. 3	54 .. 1 .. 19
79 .. 2 .. 1	19 .. 17 .. 2	54 .. 17 .. 1	97 .. 3 .. 54

ALE *and* BEER MEASURE.

A.B.fir.gal.	*B.B.fir.gal.*	*hhd. gal. qt.*	*hhd. gal. qt.*
25 .. 2 .. 7	37 .. 2 .. 8	76 .. 51 .. 2	76 .. 2 .. 1
17 .. 3 .. 5	54 .. 1 .. 7	57 .. 3 .. 3	95 .. 34 .. 2
96 .. 2 .. 6	97 . 3 .. 8	97 .. 27 .. 3	57 .. 16 .. 3
75 .. 1 .. 4	78 .. 2 .. 5	54 .. 17 .. 2	22 .. 14 .. 1
96 .. 3 .. 7	47 .. – .. 7	97 .. 19 .. 3	32 .. 37 .. 3
75 .. – .. 5	35 .. 2 .. 5	56 .. 38 .. –	57 .. 16 .. 1

DRY MEASURE.

qr. bu. p.	*qu. bu. p.*	*ch. bu. p.*	*ch. bu. p.*
75 .. 7 .. 2	36 .. 2 .. 1	75 .. 27 .. 2	73 .. 2 .. 1
37 .. 2 .. 3	71 .. – .. 3	57 .. 3 .. 1	41 .. 24 .. –
51 .. 2 .. –	53 .. 6 .. –	95 .. 25 .. 3	92 .. 16 .. 1
79 .. 7 .. 1	82 .. 4 .. 1	76 .. 35 .. 2	79 .. 13 .. 2
55 .. – .. 3	95 .. 3 .. 3	97 .. 25 .. 1	54 .. 17 .. 3
96 .. 2 .. 1	78 .. 2 .. 1	75 .. 16 .. 3	79 .. 25 .. 1

TIME.

h. m. ″	*d. h. m.*	*w. d. h.*	*w. d. h.*
52 .. 57 .. 35	72 .. 23 . 27	71 .. 3 .. 11	57 .. 2 .. 15
97 .. 16 .. 27	54 .. 14 .. 35	51 .. 2 .. 9	95 .. 3 .. 21
16 .. 58 .. 45	97 .. 13 .. 21	76 .. – .. 21	76 .. – .. 15
96 .. 18 .. 31	58 .. 21 .. 45	95 .. 3 .. 21	53 .. 2 . 21
75 .. 35 .. 21	96 20 . 48	76 .. 1 .. 15	98 .. – .. 18

The

The APPLICATION.

1. A Man born in the Year 1750, when will he be 47 Years of Age? *Anſwer* 1797.

2. *A*, *B*, *C*, *D*, went Partners in the Purchaſe of a Quantity of Goods; *A* laid out £7. half a Guinea and a Crown, *B* 49*s*. *C* 54*s*. 6*d*. and *D* 87*d*. What was laid out in all? *Anſwer* £13..6..3.

3. A Man lent his Friend at different Times theſe ſeveral Sums, *viz*. £63. £25..15. £32..7. £15..14..10 and four ſcore and nineteen Pounds, half a Guinea and a Shilling. How much did he lend in all? *Anſwer* £236..8..4

4. What's the Eſtate worth *per Ann.* when the Taxes are 21 Guineas, the neat Income 8 Score £19..14? *Anſwer* £201..15.

5. There are three Numbers, the firſt 215, the ſecond 519, and the third is as much as the other two. What is the ſum of them all? *Anſwer* 1468.

6. Bought a Parcel of Goods, for which I paid £54.17. for packing 13*s*. 8*d*. Carriage £1..5..4. and ſpent about the Bargain 14*s*. 3*d*. What do theſe Goods ſtand me in? *Anſwer* £57..10..3.

7. There are two Numbers, the leaſt whereof is 40, their Difference 14, I deſire to know what is the greateſt Number, and the Sum of both? *Anſwer* 54 *greateſt Number*, 94 *Sum*.

8. A Gentleman left his eldeſt Daughter £1500 more than the youngeſt, and her Fortune was 11 thouſand 11 Hundred, and £11, What was the eldeſt Siſter's Fortune, and what did the Father leave them?
Anſ. Eldeſt Siſter's Fortune £13611. *Father left them* £25722.

SUBTRACTION *of* MONEY, WEIGHTS, *and* MEASURES.

RULE. Subtract as in Integers: only when any of the lower Denominations are greater than the upper, borrow as many of that as make one of the next Superior, adding it to the upper, from which take the leſſer; ſet down the Difference, and carry 1 to the next lower Denomination, for what you borrowed.

PROOF. As Integers.

MONEY.

MONEY.

	£.	s.	d.		£.	s.	d.
Borrowed	715	2	7¼	Lent	316	3	5½
Paid	476	3	8½	Received	218	2	1¾
Remains to pay	238	18	10¾				
Proof	715	2	7¼				

£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
87	2	10	3	15	1½	25	2	5¼	37	3	4¼
79	3	7½	1	14	7	17	9	8½	17	5	2½

£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
329	17	1½	59	15	3¼	71	2	4	527	3	5½
257	14	7	36	17	2½	19	13	7¾	139	5	7½

Borrowed	25107..15..7	Lent	25106.. 1..6
	375.. 5..5¼		271..13..7¼
Paid	259.. 5..7½	Received	359..15..3
at	395..13..4¾	at	475..13..9¾
different	523..17..3	ſeveral	527..15..3¼
Times	274..15..7¼	Payments	279..16..5
	325..13..5		150..—..—
Paid in all			
Remains to pay			

TROY WEIGHT.

	oz. dt gr.	oz. dt. gr.	lb. oz. dt gr.	lb.oz.dt.gr.
Bought	27..15..2	7..5..15	52..1.. 7..2	7..2..5..5
Sold	21..14..7	6..7..14	39..–..15..7	5..7..1..7
Unſold				

AVOIRDUPOISE WEIGHT.

lb. oz. dr	lb. oz. dr.	cwt. qrs. lb.	T. ct. qrs. lb.
25 .. 11 .. 15	35 .. 10 .. 5	35 .. 1 .. 21	21 .. 1 .. 2 .. 7
17 .. 9 .. 15	29 .. 12 .. 7	25 .. 1 .. 20	9 .. 1 .. 3 .. 5

APOTHECARIES WEIGHT.

℥. ʒ. ℈. *gr.*	℥. ʒ. ℈. *gr.*	*lb.* ℥. ʒ. ℈.	*lb:* ℥. ʒ. ℈.
27 .. 1 .. – .. 1	3 .. 1 .. 2 .. 4	5 .. 2 .. 1 .. –	9 .. 7 .. 2 .. 1
15 .. 2 .. – .. 7	1 .. – .. – .. 7	2 .. 5 . 2 .. 1	5 . 7 .. 3 .. 1

CLOTH MEASURE.

E.F. qrs. n.	*yds. qrs. n.*	*yds. qrs. n.*	*E.F. qrs. n.*
35 .. 2 .. 2	47 .. 1 .. –	71 .. 1 .. 2	35 .. 2 .. 1
17 .. 2 .. 1	35 .. 2 .. 2	3 .. 2 . 1	17 .. 3 .. 2

LONG MEASURE.

f. in. bar.	*yds. f. in.*	*m. fur. p.*	*lea. m. f. p*
25 .. 1 .. –	37 .. 2 .. 1	52 .. 1 .. 27	71 .. 1 .. 7 .. –
17 .. 2 .. 2	15 .. 2 .. 7	25 .. 7 .. 35	50 .. – .. 3 .. 27

LAND MEASURE.

a. r. p.	*a. r. p.*	*a. r. p.*	*a. r. p*
75 .. 1 .. 7	37 .. 1 .. 27	25 .. – .. 1	325 .. 2 .. 1
39 .. – .. 27	35 .. 2 .. 15	17 .. 1 .. –	279 .. 3 ..

WINE MEASURE.

run. gal. qts.	*tier. gal. qts.*	*hhd. gal. qts.*	*tun. hhd. gal*
72 .. 1 .. 1	25 .. 27 .. 1	75 .. 57 .. 1	79 .. 2 .. 14
35 .. 1 .. 2	19 .. 35 .. 2	57 .. 59 .. 1	35 .. 3 .. 27

ALE *and* BEER MEASURE.

A.B. fir. gal.	*B.B. fir. gal.*	*hhd. gal. qts.*	*hhd. gal. qts*
25 .. 1 .. 2	37 .. 2 . 1	27 .. 27 .. 1	709 .. 2 ..
21 .. 1 .. 5	25 .. 1 .. 7	19 .. 50 .. 2	157 .. 3 ..

DRY MEASURE.

qu. bu. p.	*qu. bu. p.*	*ch. bu. p.*	*ch. bu.*
72 .. 1 .. 2	65 .. 2 .. 1	79 .. 3 . –	35 .. 3 ..
35 .. 2 .. 3	57 .. 2 .. 3	54 .. 7 . 1	23 . 5 ..

TIME.

h. ′ ″	*d. h.* ′	*m. w. d.*	*m. w.*
75 .. 1 .. 27	72 .. 1 .. 51	35 .. 2 .. 1	65 .. 2 ..
52 .. 7 .. 31	36 .. 3 .. 27	17 .. 3 .. 5	14 .. 1 ..

The APPLICATION.

1. A Man born in the Year 1723, what was his Age in the Year 1766? *Anſwer* 43.

2. What is the Difference between the Age of a Man born in 1710, and another born in 1766? *Anſ.* 56.

3. A Merchant had 5 Debtors, *A*, *B*, *C*, *D*, and *E*; which, together owed him £1156, *B*, *C*, *D*, and *E*, owed him £737, what was *A*'s Debt? *Anſ.* £419.

4. When an Eſtate of £300 *per Annum* is reduced, on paying of Taxes, to 12 Score, and £14..6*s*. what is the Tax? *Anſwer* £45..14..–.

5. What is the Difference between 9154, and the Amount of 754 added to 305? *Anſwer* 8095.

6. A Horſe in his Furniture is worth £37..5*s*. out of it 14 Guineas: How much does the Price of the Furniture exceed that of the Horſe? *Anſwer* £7..17..–.

7. A Merchant at his Out-ſetting in Trade, owed £750. He had in Caſh, Commodities, the Stocks, and good Debts, £12510..7..–. He cleared the firſt Year by Commerce £452..3..5. what was the neat Balance at the 12 Months End? *Anſwer* £12212..10..5.

8. A Gentleman dying left £45247, between two Daughters; the Youngeſt was to have 15 Thouſand, 15 Hundred, and twice £15. What was the elder Siſter's Fortune? *Anſwer* £28717.

MULTIPLICATION *of ſeveral* DENOMINATIONS.

RULE. Multiply the firſt Denomination by the Quantity given, dividing the Product by as many of that as make one of the next, ſetting down the Remainder, and add the Quotient to the next Superior, after it is multiplied.

If the given Quantity is above 12, multiply by any two Numbers, which multiplied together, will make the ſame Number; but if no two Numbers multiplied together will make the exact Number, then multiply the top Line by as many as is wanting, adding it to the laſt Product.

PROOF. By Diviſion.

£.	s.	d.	£.	s.	d.	£.	s.	d.	£.	s.	d.
5 ..	12 ..	7¼	75 ..	13 ..	1½	62 ..	5 ..	4¼	57 ..	2 ..	4¾
		2			5			4			5
1 ..	5 ..	2½									

lb. oz. dwt. gr.	*ton. cwt. qrs. lb.*	*yds. n. qrs.*	*m. fur. p.*
8 .. 5 .. 17 .. 4	25 .. 7 .. 2 .. 1	76 .. 1 .. 2	36 .. 7 .. 5
7	8	2	5
a. r. p.	*A.B. fir. gal.*	*B.B. fir. gal.*	*m. fur. p.*
75 .. 2 .. 1	32 .. 1 .. 7	26 .. 2 .. 7	54 .. 2 .. 1
9	7	3	5

1. 18 Yds of Cloth, at 9*s.* 6*d.* *per* yd.
9×2=18.

9
4 .. 5 .. 6
2
8 .. 11 .. –

2. 26 lb. of Tea, at £1..2..6 *per* lb.
8×3+2=26

8
9 .. – .. –
3
27 .. – .. –
Top Line × 2 2 .. 5 .. –
29 .. 5 .. –

3. 17 Ells of Holland, at 7*s.* 8*d.* ½ *per* Ell.
Facit £6 .. 11 .. –½

4. 35 Firkins of Butter, at 15*s.* 3*d.* ½ *per* Firkin.
Facit £26 .. 15 .. 2½

5. 75 lb. of Nutmegs, at 7*s.* 2*d.* ¾ *per* lb.
Facit £27 .. 2 .. 2¼

6. 37 yds of Tabby, at 9*s.* 7*d.* *per* yd.
Facit £17 .. 14 .. 7

7. 97 cwt. of Cheeſe, at £1..5..3 *per* cwt.
Facit £122 .. 9 .. 3

8. 43 Doz. of Candles, at 6*s* 4*d.* *per* doz.
Facit £13 .. 12 .. 4

9. 127 lb. of Bohea Tea, at 12*s.* 3*d.* *per* lb.
Facit £77 .. 15 .. 9

10. 135 Gallons of Rum, at 7*s.* 5*d.* *per* Gall.
Facit £50 .. 1 .. 3

11. 74 Ells of Diaper, at 1*s.* 4*d.* ½ *per* Ell.
Facit £5 .. 1 .. 9

12. 6 doz. Pair of Gloves, at 1*s.* 10*d.* *per* Pair.
Facit £6 .. 12 .. –

When the given Quantity conſiſts of ½, ¼, *&c.* divide the Price by ½, ¼, *&c.* and add it to the Product.

13. 25 ½ *Ells* of Holland, at 3*s.* 4*d.* ½ *per Ell.*

5   5×5=25

16 .. 10½

5

4 .. 4 .. 4½ =25

— .. 1 .. 8¼ = ½

4 .. 6 .. —¾ =25 ½

14. 75 ½ *Ells* of Diaper, at 1*s.* 3*d. per Ell.*
Facit £4 .. 14 .. 4 ½.

15. 19 ½ *Ells* of Damaſk, at 4*s.* 3*d. per Ell.*
Facit £4 .. 2 .. 10 ½.

16. 35 ½ *Ells* of Dowlas, at 1*s.* 4*d. per. Ell.*
Facit £2 .. 7 .. 4.

17. 7 ¼ *cwt.* of Malaga Raiſins, at £1 .. 1 .. 6. *per cwt.*
Facit £7 .. 15 .. 10 ½.

18. 6 ½ *Barrels* of Herrings, at £3 .. 15 .. 7.
Facit £24 .. 11 .. 3 ½.

19. 35 ½ *cwt.* Double refined Sugar, at £4 .. 15 .. 6 *per.*
Facit £169 .. 10 .. 3.

20. 154 ½ *cwt.* of Tobacco, at £4 .. 17 .. 10. *per cwt.*
Facit £755 .. 15 .. 3.

21. 117 ¼ *Gallons* of Arrack, at 12*s.* 6*d. per Gall.*
Facit £73 .. 5 .. 7 ½.

22. 85 ¾ *cwt.* Cheeſe, at £1 .. 7 .. 8. *per cwt.*
Facit £118 .. 12 .. 5.

23. 29 ¼ *lb.* of fine Hyſon Tea, at £1 .. 3 .. 6 *per lb.*
Facit £34 .. 7 .. 4 ½

24. 17 ¾ *Yds.* of ſuperfine *Scarlet* Drab, at £1 .. 3 .. 6 *per.*
Facit £20 .. 17 .. 1 ½

25. 37 ½ *Yds.* of rich Brocaded Silk, at 12*s.* 4*d. per.*
Facit £23 .. 2 .. 6.

26. 56 ¾ *cwt.* of Sugar, at £2 .. 18 .. 7. *per cwt.*
Facit £166 .. 4 .. 7 ¼.

27. 96 ½ *cwt.* of Currants, at £2 .. 15 .. 6. *per cwt.*
Facit £267 .. 15 .. 9.

28. 45 ¾ *lb.* of Belladine Silk, at 18*s.* 6*d. per lb.*
Facit £42 .. 6 .. 4 ½.

29. 87 *Buſhels* ¾ of Wheat, at 4*s.* 3*d. per Buſhel.*
Facit £18 .. 12 .. 11 ¼.

30. 120 ¾ *cwt.* of Hops, at £4 .. 7 .. 6. *per cwt.*
Facit £528 .. 5 .. 7 ½.

The APPLICATION.

1. What Sum of Money muſt be divided amongſt 18 Men, ſo that each may receive £14 .. 6 .. 8 ½ ?
Anſ. £258 .. – .. 9.

2. A Privateer of 250 Men took a Prize which amounted to £125 .. 15 .. 6 to each Man, what was the Value of the Prize? *Anſ.* £31443 .. 15 .. –.

3. What is the Difference between 6 Dozen Dozen, and half a Dozen Dozen; and what is their Sum and Product? *Anſ.* 792, *Diff. Sum* 936, *Product* 62208.

4. What Difference is there between twice Eight and Fifty, and twice Fifty-eight, and what's their Product? *Anſ.* 50, *Diff.* 7656, *Prod.*

5. There are 2 Numbers, the greater of them is 37 Times 45, and their Difference 19 Times 4; their Sum and Product are required? *Anſ.* 3254, *Sum.* 2645685, *Pr*

6. The Sum of 2 Numbers is 360, the leſs of them 144 what is their Product, and the Square of their Difference *Anſ.* 31104 *Product,* 5184, *Square of their Differenc*

7. If an army, conſiſting of 187 Squadrons of Horſe each 157 Men, and 207 Battalions, each 560 Men, ho many effective Soldiers, ſuppoſing that in 7 Hoſpitals ther are 473 Sick? *Anſ.* 144806.

8. What ſum did that Gentleman receive in Dowry wi his Wife, whoſe Fortune was her Wedding Suit; her Petti coat, having two rows of Furbelows, each Furbelow 8 Quills, and each Quill 21 Guineas? *Anſ.* £3836 .. 14 .. –

9. A Merchant had £19118, to begin Trade with. F 5 Years together he cleared £1086. a Year; the next Years he made good £2715 .. 10 .. 6. a Year: But the 3 Years he was in Trade, had the Misfortune to loſe, on Year with another, £475 .. 4 .. 6. a Year: What was h real Fortune at 12 Years End? *Anſ.* £33984 .. 8 ..

DIVISION *of ſeveral* DENOMINATIONS.

RULE. Divide the firſt Denomination on the Le Hand; and, if any remains, multiply them by many of the next leſs as make one of that, which add the next, and divide as before.

PROOF. By Multiplication.

l. *s.* *d.*	*l.* *s.* *d.*	*l.* *s.* *d.*	*l.* *s.*
2)25 .. 2 .. 4(	5)37 .. 3 .. 7(	4)57 .. 3 .. 6(	5)52 .. 7 ..
12 .. 11 .. 2			

lb. *oz.* *dwt* *gr.*   *ib.* *oz.* *dr.*   *T.* *cwt.* *qrs.* *lb.*
7)75 .. 3 .. 7 .. 5(8)35 .. 14 .. 13(6)5 .. 10 .. 1 .. 13(
yds. *qrs.* *n.*   *m.* *f.* *p.*   *yds.* *f.* *in.*
11)35 .. 1 .. 3(9)76 .. 3 .. 27(12)75 .. 2 .. 9(
A. B. *fir.* *gal.*   *B. B.* *fir.* *gal.*   *ch.* *bu.* *pk.*
12)35 .. 2 .. 5(9)55 .. 3 .. 7(11)357 .. 2 .. 1(

The APPLICATION.

1. If a Man ſpends £257 .. 2 .. 5 in 12 Months Time, what is that *per* month? *Anſ.* £21 .. 8 .. 6 $\frac{1}{4}$.

2. The Cloathing of 35 Charity Boys came to £57..3..7. vhat is the Expence of each? *Anſ.* £1 .. 12 .. 8.

3. If I give £37 .. 6 .. 4 $\frac{3}{4}$ for 9 Pieces of Cloth, what did I give *per* Piece? *Anſ.* £4 .. 2 .. 11.

4. If 20 Cwt. of Tobacco came to £27 .. 5 .. 4 $\frac{1}{2}$, at what Rate is that *per* Cwt.? *Anſ.* £1 .. 7 .. 3.

5. What is the Value of 1 Hogſhead of Beer, when 120 are ſold for £154 .. 17 .. 10.? *Anſ.* £1 .. 5 .. 9 $\frac{3}{4}$.

6. Bought 72 Yards of Cloth for £85 .. 6 .. – I deſire to know at what Rate *per* Yard? *Anſ.* £1 .. 3 .. 8 $\frac{1}{4}$.

7. Gave £275 .. 3 .. 4. for 36 Bales of Cloth, what is hat for 2 Bales? *Anſ.* £15 .. 5 .. 8 $\frac{3}{4}$.

8 A Prize of £7257 .. 3 .. 6, is to be equally divided amongſt 500 Sailors, what is each Man's Share?
Anſ. £14 .. 10 .. 3 $\frac{1}{4}$.

9. There are 2545 Bullocks to be divided among 509 Men, I deſire to know how many each Man had, and the Value of each Man's Share, ſuppoſing every Bullock worth £9 .. 14 .. 6?
Anſ. 5 *Bullocks each Man,* £48 .. 12 .. 6, *each Share.*

10. A Gentleman has a Garden walled in, containing 625 Yards, the Breadth was 35 Yards, what was the Length? *Anſ.* 275.

11. A Club in *London,* conſiſting of 25 Gentlemen, oined for a Lottery Ticket of £10. Value, which came up Prize of £4000. I deſire to know what each man contributed, and what each Man's Share came to?
Anſ. each contributed 8*s. each Share* £160.

12. A Trader cleared £1156. equally in 17 Years, how uch did he lay by in a Year? *Anſ.* £68.

13. Another cleared £2805 in 7 $\frac{1}{2}$ Years, what was his early Increaſe of Fortune? *Anſ.* £374.

14. What Number to the 43d Part of 4429 will raiſe to 240? *Anſ.* 137.

Divide 20*s.* between *A*, *B*, and *C*, in ſuch Sort that may have 2*s.* leſs than *B*, and *C*, 2*s.* more than *B*?
Anſ. A, 4*s.* 8*d.* *B.* 6*s.* 8*d.* *C.* 8*s.* 8

16. If there are 1000 Men to a Regiment, and but Officers, how many private men are there to one Officer? *Anſ.* 19.

17. What Number is that which multiplied by 784 will make the Product 3013248? *Anſ.* 384.

18. The Quotient is 1083, the Diviſor, 28604, wh was the Dividend, if the Remainder came out 1788?
Anſ. 30979920.

BILLS *of* PARCELS.

HOSIER'S.

Mr. John Thomas
Bought of Samuel Green, March 7, 1770.

		S.	D.		
8 Pair of Worſted Stockings	at	4	.. 6	*per* Pair	£
5 Pair of Thread ditto - - -	at	3	.. 2	- - - - - - - -	
3 Pair of Black Silk ditto -	at	14	.. 0	- - - - - - - -	
6 Pair of milled Hoſe - - - -	at	4	.. 2	- - - - - - - -	
4 Pair of Cotton ditto - - -	at	7	.. 6	- - - - - - - -	
2 Yards of fine Flannel - -	at	1	.. 8	*per* Yard. -	

£7 .. 12 ..

MERCER'S.

Mr. Iſaac Grant
Bought of John Sims, March 12, 177

		S.	D.		
15 Yards of Sattin - - - - -	at	9	.. 6	*per* Yard	£
18 Yards of flowered Silk	at	17	.. 4	- - - - - - - -	
12 Yards of rich Brocade -	at	19	.. 8	- - - - - - - -	
16 Yards of Sarſanet - - - -	at	3	.. 2	- - - - - - - -	
13 Yards of Genoa Velvet	at	27	.. 6	- - - - - - - -	
23 Yards of Luſtring - - -	at	6	.. 3	- - - - - - - -	

£62 .. 2 ..

LINEN-DRAPER'S.

Mr Simon Surety

Bought of Joſiah Short, 27 March, 1770.

		S.	D.		
4 Yards of Cambric - - -	at	12	6	*per* Yard	£
12 Yards of Muſlin - - - -	at	8	3	- - - - - - -	
15 Yards of printed Linen	at	5	4	- - - - - - -	
2 Dozen of Napkins - - -	at	2	3	each - - - -	
14 Ells of Diaper - - - - - -	at	1	7	*per* Ell - -	
35 Ells of Dowlas - - - - - -	at	1	1 ½	- - - - - -	

£17..4..6½.

MILLENER'S.

Mrs. Bright

Bought of Lucy Brown, 5 April, 1770,

		£.	S.	D.		
18 Yards of fine Lace - - -	at	–	12	3	*per* Yard	£
5 Pair of fine Kid Gloves	at	–	2	2	*per* Pair -	
12 Fans of *French* Mounts	at	–	3	6	each - - - -	
2 Fine lac'd Tippets - - -	at	3	3	–	- - - - - - -	
4 Dozen of *Iriſh* Lamb -	at	–	1	3	*per* Pair -	
6 Sets of Knots - - - - - - -	at	–	2	6	*per* Set - -	

£23..14..4

WOOLLEN-DRAPER'S.

Mr. Thomas Sage

Bought of Ellis Smith, 7 April, 1770,

		£.	S.	D.		
7 Yards of fine Serge - - -	at	–	3	9	*per* Yard	£
8 Yards of Drugget - - -	at	–	9	–	- - - - - - -	
5 Yards of ſuperfine Scarlet	at	1	2	–	- - - - - - -	
6 Yards of black ditto - -	at	–	18	–	- - - - - - -	
5 Yards of Shalloon - - -	at	–	1	9	- - - - - - -	
7 Yards of Drab - - - - - -	at	–	17	6	- - - - - - -	

£59..5..–

LEATHER-SELLER's.

Mr. Giles Harris

Bought of Abel Smith, 15 *April*, 1770,

		S.	D.		
27 Calf Skins - - - - - - -	at	3	.. 9	*per* Skin	£
75 Sheep Skins - - - - - -	at	1	.. 7	- - - -	
36 Coloured ditto - - - - -	at	1	.. 8	- - - -	
15 Buck Skins - - - - - - -	at	11	.. 6	- - - -	
17 Ruſſia Hides - - - - - -	at	10	.. 7	each - -	
120 Lamb Skins - - - - - - -	at	1	.. 2½	- - -	

£38..17..

GROCER's.

Mr. Richard Groves

Bought of Francis Elliot, 21 April, 1770,

		S.	D.		
25 ℔. of Lump Sugar - -	at	–	.. 6½	*per* ℔.	£
2 Loaves of double refined, Weight 15 ℔.	at	–	.. 11½	- - -	
14 ℔. of Rice - - - - - -	at	–	.. 3	- - - -	
28 ℔. of *Malaga* Raiſins -	at	–	.. 5	- - - -	
15 ℔. of Currants - - - -	at	–	.. 5½	- - -	
7 ℔. of black Pepper -	at	1	.. 10	- - - -	

£3..2..9

CHEESE-MONGER's.

Mr. Charles Croſs

Bought of Samuel Grant, 23 April, 1770,

		S.	D.		
8 ℔. of *Cambridge* Butter	at	–	.. 6	*per* ℔.	£
17 ℔. of new Cheeſe - -	at	–	.. 4	- - - -	
½ Firkin of Butter, wt. 28 ℔.	at	–	.. 5½	- - -	
5 *Cheſhire* Cheeſes, wt. 127 ℔.	at - - - - - - - - -	–	.. 4	- - - -	
2 *Warwickſhire* do. wt. 15 ℔.	at - - - - - - - - -	–	.. 3	- - - -	
12 ℔. of Cream Cheeſe -	at	–	.. 6	- - - -	

£3..14..

CORN-

CORN-CHANDLER'S.

Mr. Abraham Doyley
Bought of Iſaac Jones, 25 April, 1770.

		S.	D.	
Tares 19 Buſhels - - - -	at	1 ..	10 *per* Buſhel	£
Peas 18 Buſhels - - - -	at	3 ..	9 ½ - - - - -	
Malt 7 Quarters - - - - -	at	25 ..	– *per* Quarter	
Hops 15 ℔ - - - - - - - -	at	1 ..	5 *per* ℔. - -	
Oats 6 Quarters - - - -	at	2 ..	4 *per* Buſhel	
Beans 12 Buſhels - - - -	at	4 ..	8 - - - - - -	
				£23 .. 7 .. 4

REDUCTION

IS the bringing or reducing Numbers of one Denomination into other Numbers of another Denomination, retaining the ſame Value, and is performed by Multiplication and Diviſion.

Firſt, All great Names are brought into ſmall, by multiplying with ſo many of the leſs as make one of the greater.

Secondly, All ſmall names are brought into great, by dividing with ſo many of the leſs as make one of the greater.

A TABLE *of* ſuch COIN'S *as are current in* England.

	£.	s.	d.		£.	s.	d.
Portugal Pieces	3 ..	12 ..	–	Guinea -	1 ..	1 ..	–
Ditto - - - - - -	1 ..	16 ..	–	Half ditto	– ..	10 ..	6
Half ditto - - -	– ..	18 ..	–	¼ ditto -	– ..	5 ..	3
¼ ditto - - - - - -	– ..	9 ..	–	Crown -	– ..	5 ..	–
⅛ ditto - - - - -	– ..	4 ..	6	Half ditto	– ..	2 ..	6
Moidore - - -	1 ..	7 ..	–				
Half ditto - - -	– ..	13 ..	6				
Quarter ditto - -	– ..	6 ..	9				

Note, *There are ſeveral Pieces that ſpeak their own Value; ſuch as a Six-pence, Three-pence, Two-pence, Penny, Half-Penny, Farthing.*

REDUCTION *Deſcending.*

1. In £8. how many Shillings and Pence?
20
———
160 *Shillings.*
12
———
1920 *Pence.*
———

2. In £12. How many Shillings, Pence and Farthings?
Anſ. 240*s.* 2880*d.* 11520 *far.*

3. How many Shillings, Pence and Farthings, are there in £18? *Anſ.* 360*s.* 4320*d.* 17280 *far.*

4. Reduce £7. and a Crown into Shillings and Pence.
Facit 145*s.* 1740*d.*

5. How many Farthings are there in 21 Guineas?
Anſ. 21168.

6. In £17 .. 5 .. 3¼, how many Farthings? *Anſ.* 16573.

7. In £25 .. 14 .. 1, how many Shillings and Pence?
Anſ. 514*s.* 6169*d.*

8. In 15 Crowns, how many Shillings and Six-Pences?
Anſ. 75*s.* 150 *Six-pences.*

9. How many Crowns and Shillings in £25?
Anſ. 100 *Crowns*, 500*s*,

10. In 57 Half-Crowns, how many Pence and Farthings?
Anſ. 1710*d.* 6840 *far.*

11. In 52 Crowns, as many Half-Crowns, Shillings, and Pence, how many Farthings? *Anſ.* 21424.

12. How many Half-Crowns, Six-pences and Three-pences, are there in £75.
Anſ. 600 *Half-Crs.* 3000 *Six-pences,* 6000 *Three-pences.*

REDUCTION *Aſcending.*

13. In 1920 Pence, how many Shillings and Pounds?
Anſ. 160*s.* £8.
12)1920
———
2|0)16|0(*Shillings.*
———
8 *Pounds.*

14. In 11520 Farthings, how many Pence, Shillings and Pounds? *Anſ.* 2880*d.* 240*s.* £12.

15. How many Pence, Shillings, and Pounds, are there in 17280 Farthings? *Anſ.* 4320*d.* 360*s.* £18.

16. Reduce 1740 Pence into Shillings and Pounds.
Facit 145*s.* £7 .. 5.

17. How many Guineas in 21168 Farthings?
Anſ. 21 *Guineas.*

18. In 16573 Farthings how many Pounds?
Anſ. £17 .. 5 .. 3$\frac{1}{4}$.

19. In 6169 Pence how many Shillings and Pounds?
Anſ. 514*s.* £25 .. 14 .. 1.

20. In 900 Pence, how many Shillings and Crowns?
Anſ. 75*s.* 15 *Crowns.*

21. How many Crowns and Pounds in 500 Shillings?
Anſ. 100 *Crowns,* £25.

22. In 6840 Farthings, how many Pence, and Half-Crowns? *Anſ.* 1710*d.* 57 *Half-Crowns.*

23. In 21424 Farthings, how many Crowns, Half-Crowns, Shillings and Pence, and of each an equal Number? *Anſ.* 52.

24. How many Six-pences, Half-Crowns and Pounds in 6000 Three-pences?
Anſ. 3000 *Six-pences,* 600 *Half-Crowns,* £75.

Aſcending and Deſcending.

25. In 1560 Pence, how many Crowns and Shillings?
Anſ. 26 *Crowns,* 130*s.*

6|0)156|0
―――
26 *Crowns.*
5
―――
130 *Shillings.*

26. Reduce 130 Shillings into Crowns and Pence.
Facit 26 *Crowns,* 1560*d.*

27. How many Shillings, Crowns and Pounds in 60 Guineas? *Anſ.* 1260*s.* 252 *Crowns,* £63.

28. In £63. how many Crowns, Shillings and Guineas?
Anſ. 252 *Crowns,* 1260*s.* 60 *Gui.*

29. Reduce 76 Moidores into Shillings and Pounds.
Facit 2052*s.* £102 .. 12 .. –

30. Reduce £102 .. 12 .. – into Shillings and Moidores.
Facit 2052*s.* 76 *Moidores.*

31. How many Shillings, Half-Crowns and Crowns ar there in £556 and of each an equal number?

Anſ. 1308 *each, and* 2*s over*

32. In 1308 Half-Crowns, as many Crowns and Shillings how many Pounds? *Anſ.* £555 .. 18 .. –.

33. Seven Men brought £15 .. 10 .. –. each into the Mi to be changed for Guineas, how many muſt they have i all? *Anſ.* 103 *Guineas,* 7*s. over.*

34. If 103 Guineas and 7 Shillings is to be divided a mongſt 7 Men, how many Pounds Sterling is that to each

Anſ. £15 .. 10 .. –.

35. A certain Perſon had 25 Purſes, and in each Purſ 12 Guineas, a Crown and a Moidore, how many Pound Sterling had he in all? *Anſ.* £355.

36. A Gentleman in his Will leaves £50 to the Poor and ordered that $\frac{1}{3}$ ſhould be given to antient Men, eac to have 5*s.*—$\frac{1}{4}$ to poor Women, each to have 2*s.* 6*d*— $\frac{1}{5}$ to poor Boys, each to have 1*s.*—$\frac{1}{6}$ to poor Girls, eac to have 9*d.* and the Remainder to the Perſon that diſtribute it. I demand how many of each Sort there were, and wha the Perſon that diſtributed the Money had for his Pains?

Anſ. 66 *Men,* 100 *Women,* 200 *Boys,* 222 *Girls* £2. 13..6 *to the Perſon.*

TROY WEIGHT.

37. In 27 Ounces of Gold, how many Grains?

Anſ. 12960.

38. In 12960 Grains of Gold, how many Ounces?

Anſ. 27.

39. In 3 *lb.* 10 *oz.* 7 *dwt.* 5 *gr.* how many grains?

Anſ. 22253.

40. In 8 Ingots of Silver, each weighing 7 *lb.* 4 *oz.* 1 *dwt.* 15 *gr.* how many Ounces, Penny-weights and Grain

Anſ. 711 *oz.* 14221 *dwt.* 341304 *g*

41. How many Ingots of 7 *lb.* 4 *oz.* 17 *dwt.* 15 *gr.* eac are there in 341304 Grains? *Anſ.* 8 *Ingots.*

42. Bought 7 Ingots of Silver, each containing 23 *l* 5 *oz.* 7 *dwt.* how many Grains? *Anſ.* 945336.

43. A Gentleman ſent a Tankard to his Goldſmith, th weighed 50 *oz.* 8 *dwt.* and ordered him to make it in Spoons, each to weigh 2 *oz.* 16 *dwt.* how many had he

Anſ. 18.

44. A Gentleman delivered to a Goldſmith 137 *oz.* 6 *dwt.* 9 *gr.* of Silver, and ordered him to make it into Tankards of 17 *oz.* 15 *dwt.* 10 *gr.* each. Spoons of 21 *oz.* 11 *dwt.* 13 *gr. per* Dozen, Salts of 3 *oz.* 10 *dwt.* each, and Forks of 21 *oz.* 11 *dwt.* 13 *gr. per* Dozen; and for every Tankard to have one Salt, a dozen of Spoons, and a dozen of Forks; what is the Number of each he muſt have?

Anſ. two of each Sort, 8 *oz.* 9 *dwt.* 9 *gr. over.*

AVOIRDUPOISE WEIGHT.

Note, *There are ſeveral Sorts of Silk which are weighed by a great Pound of* 24 oz. *others by the common Pound of* 16 oz. *therefore*

To bring great Pounds into common, multiply by 3, and divide by 2, or add one half.

To bring ſmall Pounds into great, multiply by 2, and divide by 3, or ſubtract one Third.

Things bought and ſold by the Tale.

Dozens.	
12 Pieces or Things make	1 Doz.
12 Dozen - - - -	1 Groſs.
12 Groſs or 144 Doz.	1 Great Groſs.

Paper and Parchment.	
24 Sheets make	1 Quire.
20 Quire - - -	1 Ream.
2 Reams - -	1 Bundle.
1 Doz. of Par.	12 Skins.
12 Skins - - -	1 Rol'.

45. In 14769 Ounces, how many *cwt*?

Anſ. 8 *cwt.* 0 *qr.* 27 *lb.* 1 *oz.*

46. Reduce 8 *cwt.* 0 *qr.* 27 *lb.* 1 *oz.* into Quarters, Pounds, and Ounces. *Facit* 32 *qrs.* 923 *lb.* 14769 *oz.*

47. Bought 32 Bags of Hops, each 2 *cwt.* 1 *qr.* 14 *lb.* and another of 150 *lb.* how many *cwt.* in the Whole?

Anſ. 77 *cwt.* 1 *qr.* 10 *lb.*

48. In 34 *ton.* 17 *cwt.* 1 *qr.* 19 *lb.* how many Pounds?

Anſ. 78111 *lb.*

49. In 350 great Pounds, how many common? *Anſ.* 525 *lb.*

50. In 27 *cwt.* of Raiſins, how many Parcels of 18 *lb.* each?

Anſ. 168.

51. In 9 *cwt.* 2 *qrs.* 14 *lb.* of Indigo, how many Pounds?

Anſ. 1078 *lb.*

52. In

52. In 547 great Pounds, how many common Pounds?
Anſ. 820 *com. lb.* 8 *oz.*

53. Bought 27 Bags of Hops, each 2 *cwt.* 1 *qr.* 15 *lb.* and 1 Bag of 137 *lb.* how many Hundreds in the Whole?
Anſ. 65 *cwt.* 2 *qrs.* 10 *lb.*

54. How many Pounds in 27 Hogſheads of Tobacco, each weighing neat 8 *cwt.* ¾? *Anſ.* 26460.

55. In 552 common Pounds of Silk how many grea Pounds? *Anſ.* 368.

56. How many Parcels of Sugar of 16 *lb.* 2 *oz.* are ther in 16 *cwt.* 1 *qr.* 15 *lb.* *Anſ.* 113 *par.* 12 *lb.* 14 *oz.*

The Allowance uſually made in this Weight are, TARE, TRETT *and* CLOFF.

TARE is an Allowance made to the Buyer for the Weight of the *Box, Barrel, Bag, &c.* which contains the Goods bought, and is either

At ſo much *per Box, Bag, Barrel, &c.*
At ſo much *per Cent,* or,
At ſo mnch in the *Groſs Weight.*

TRETT is an Allowance of 4 *lb.* in every 104 *lb.* for Waſte, Duſt, *&c.* made by the Merchant to the Buyer.

CLOFF is an Allowance of 2 *lb.* to the Citizens of *Lond* on every Draught above 3 *cwt.* on ſome Sort of Goods.

GROSS WEIGHT, is the whole Weight of any Sort of Goods and that which contains it.

SUTTLE is when part of the Allowarce is deducted from the Groſs.

NEAT is the pure Weight, when all Allowances are deducted

RULE 1ſt. When the Tare is at ſo much *per* Bag, Barrel, *&c.* multiply the Number of Bags, Barrels, *&c.* by the Tare, and ſubtract the Product from the Groſs, the Remainder is neat.

Note, *To reduce Pounds into Gallons, multiply by 2, divid* by 15.

57. In 7 Frails of Raiſins, each weighing 5 *cwt.* 2 *qr.* 5 *lb* Groſs, Tare at 23 *lb. per* Frail, how much neat Weight?
Anſ. 37 *cwt.* 1 *qr.* 14 *lb.*

23	5 .. 2 .. 5
7	7
——4)	
28)161(5	38 .. 3 .. 7 = *Groſs Weight.*
140 1 .. 1	1 .. 1 .. 21 = *Tare.*
21	37 .. 1 .. 14 *Neat.*

58. In 241 Barrels of Figs, each 3 *qrs.* 19 *lb.* Groſs, Tare 10 *lb. per* Barrel, how many Pounds neat? *Anſ.* 22413.

59. What is the neat Weight of 25 Hogſheads of Tobacco, weighing Groſs 163 *cwt.* 2 *qrs.* 15 *lb.* Tare 100 *lb, per* Hogſhead? *Anſ.* 141 *cwt.* 1 *qr.* 7 *lb.*

60. In 16 Bags of Pepper, each 85 *lb.* 4 *oz.* Groſs, Tare *per* Bag 3 *lb.* 5 *oz.* how many Pounds neat? *Anſ.* 1311.

RULE 2. When the Tare is at ſo much in the whole Groſs Weight, ſubtract the given Tare from the Groſs, the Remainder is neat.

61. What is the neat Weight of 5 Hogſheads of Tobacco, weighing Groſs 75 *cwt.* 1 *qr.* 14 *lb.* Tare in the whole 752 *lb.*? *Anſ.* 68 *cwt.* 2 *qrs.* 18 *lb.*

62. In 75 Barrels of Figs, each 2 *qrs.* 27 *lb.* Groſs, Tare in the Whole 597 *lb.* how much neat Weight?
Anſ. 50 *cwt.* 1 *qr.*

RULE 3. When the Tare is ſo much *per Cent.* divide the Groſs Weight by the aliquot Parts of an *cwt.* which ſubtract from the Groſs, the Remainder is neat.

Note, 7 *lb.* is $\frac{1}{16}$. 8 *lb.* is $\frac{1}{14}$. 14 *lb.* is $\frac{1}{8}$. 16 *lb.* is $\frac{1}{7}$.

63. What is the neat Weight of 18 Butts of Currants, each 8 *cwt.* 2 *qrs.* 5 *lb.* Tare at 14 *lb. per Cent?*

8 .. 2 .. 5
9×2=18

76 .. 3 .. 17
2

14=$\frac{1}{8}$)153 .. 3 .. 6
19 .. 0 .. 25 $\frac{1}{4}$

134 .. 2 .. 8 $\frac{3}{4}$

64. In 25 Barrels of Figs, each 2 *cwt.* 1 *qr.* Groſ Tare *per Cent.* 16 *lb.* how much neat Weight?

Anſ. 48 *cwt.* 0 *qr.* 24 *lb.*

65. What is the neat Weight of 9 Hogſheads of Nu megs, each weighing Groſs 8 *cwt.* 3 *qrs.* 14 *lb.* Tare 16 *per cent?* *Anſ.* 68 *cwt.* 1 *qr.* 24 *lb.*

66. What is the neat Weight of 12 Caſks of Argol, Groſ 84 *cwt.* 2 *qrs.* 14 *lb.* Tare *per Cent.* 14 *lb.*

Anſ 74 *cwt.* 0 *qr.* 5 *lb.* ¼.

RULE 4. When Trett is allowed with Tare, divide Pounds Suttle by 26, the Quotient is the Trett, which ſub tract from the Suttle, Remainder is neat.

67. In one Butt of Currants, weighing 12 *cwt.* 2 *qrs.* 24 Groſs, Tare 14 *lb. per Cent.* Trett, 4 *lb. per* 104 *lb.* ho many Pounds neat?

12 .. 2 .. 24

4

50

28

14 = ⅛ 1424 *Groſs.*

178 *Tare.*

26)1246 *Suttle.*

47 *Trett.*

1199 *Neat.*

68. In 7 *cwt.* 3 *qrs.* 27 *lb.* Groſs, Tare 36 *lb.* Trett 4 *per* 104 *lb.* how many *lb.* neat? *Anſ.* 826 *lb.*

69. In 152 *cwt.* 1 *qr.* 3 *lb.* Groſs, Tare 10 *lb. per* C Trett 4 *lb. per* 104 *lb.* how much neat Weight?

Anſ. 133 *cwt.* 1 *qr.* 11 *lb*

70. In 15 Cheſts of Sugar, weighing 117 *cwt.* 0 *qr.* 21 Groſs, Tare 173 *lb.* Trett 4 *lb. per* 104 *lb.* how many neat? *Anſ.* 111 *cwt.* 0 *qr.* 22 *lb.*

RULE 5. When Cloff is allowed, multiply the Suttle by 2, divide the Product by 3, the Quotient wil the Pounds Cloff, which ſubtract from the Suttle, the mainder will be neat.

71. W

71. What is the neat Weight of 3 Hogſheads of Tobacco, weighing 15 *cwt.* 3 *qrs.* 20 *lb.* Groſs, Tare 7 *lb. per Cent.* Trett 4 *lb. per* 104. Cloff 2 *lb.* for 3 *cwt.*

Anſ. 14 *cwt.* 1 *qr.* 3 *lb.*

$7 = \frac{1}{16}$	15 ..	3 ..	20	*Groſs.*
		3 ..	27 ½	*Tare.*
$\frac{1}{26}$	14 ..	3 ..	20 ½	*Suttle.*
		2 ..	8	*Trett.*
	14 ..	1 ..	12 ½	*Suttle.*
			9 ½	*Cloff.*
	14 ..	1 ..	3	*Neat.*

72. In 7 Hogſheads of Tobacco, each weighing Groſs 5 *cwt.* 2 *qrs.* 7 *lb.* Tare 8 *lb. per Cent.* Trett 4 *lb. per* 104 *lb.* Cloff, 2 *lb. per* 3 *cwt.* how much neat Weight?

Anſ. 34 *cwt.* 2 *qrs.* 8 *lb.*

APOTHECARIES WEIGHT.

73. In 27 *lb.* 7 ℥. 2 ʒ. 1 ℈. 2 *gr.* how many Grains?

Anſ. 159022.

74. How many *lb.* ℥. ʒ. ℈. and *grs.* are there in 159022 Grains? *Anſ.* 27 *lb.* 7 ℥. 2 ʒ. 1 ℈. 2 *grs.*

CLOTH MEASURE.

75. In 27 Yards, how many Nails? *Anſ.* 432.

76. In 75 Ells of *Engliſh*, how many Yards? *Anſ.* 93 *yds.* 3 *qrs.*

77. In 93 ¾ Yards, how many *Engliſh* Ells? *Anſ.* 75.

78 In 24 Pieces, each containing 32 *Flemiſh* Ells, how many Ells *Engliſh?* *Anſ.* 460 *Ells*, 4 *qrs.*

79. In 17 Pieces of Cloth, each 27 Ells *Flemiſh*, how many Yards? *Anſ.* 344 *Yards*, 1 *qr.*

80. Bought 27 Pieces of *Engliſh* Stuffs, each 27 Ells, how many Yards? *Anſ.* 911 *Yards*, 1 *qr.*

81 In 911 ¼ Yards, how many *Engliſh* Ells? *Anſ.* 729.

82. In 12 Bales of Cloth, each 25 Pieces, each 15 Ells *Engliſh*, how many Yards? *Anſ.* 5625.

LONG MEASURE.

83. In 57 Miles, how many Furlongs and Poles?
Anſ. 456 *Furlongs*, 18240 *Pole*

84. In 7 Miles, how many Feet, Inches, and Barley Corn
Anſ. 36960 *Feet*, 443520 *Inches*, 1330560 *Barley Corn*

85. In 18240 Poles, how many Furlongs and Miles?
Anſ. 456 *Furlongs*, 57 *Miles.*

86. In 72 Leagues, how many Yards? *Anſ.* 38016

87. In 380160 Yards, how many Miles and Leagues?
Anſ. 216 *Miles*, 72 *Leagues.*

88. If from *London* to *York* be accounted 50 Leagues, demand how many Miles, Yards, Feet, Inches, and Barle Corns? *Anſ.* 150 *Miles*, 264000 *Yards*, 792000 *Fe* 9504000 *Inches*, 28512000 *Barley Corns.*

89. How many Barley Corns will reach round the Worl which is 360 Degrees, each Degree 69 Miles and an Hal
Anſ. 4755801600 *Barley Corns.*

LAND MEASURE.

90. In 27 Acres, how many Roods and Perches?
Anſ. 108 *Roods*, 4320 *Perches.*

91. In 4320 Perches, how many Acres? *Anſ.* 27.

92. A Perſon having a Piece of Ground, containing Acres, 1 Pole, has a Mind to diſpoſe of 15 Acres to *A*, deſire to know how many Perches he will have left?
Anſ. 3521.

93. There are 4 Fields to be divided into Shares of Perches each; the firſt Field containing 5 Acres; the ſeco 4 Acres, 2 Poles; the third, 7 Acres, 3 Roods; and fourth, 2 Acres, 1 Rood; I deſire to know how many Sha are contained therein? *Anſ.* 40 *Shares*, 42 *Perches.*

WINE MEASURE.

94. Bought 5 Tun of Port Wine, how many Gallons Pints? *Anſ.* 1260 *Gallons*, 10080 *Pi*

95. In 10080 Pints, how many Tuns? *Anſ.* 5

96. In 5896 Gallons of Canary, how many Pipes Hogſheads, and of each a like Number?
Anſ. 31 *of each*, 37 *Gallons o*

97.

97. A Gentleman ordered his Butler to bottle off $\frac{2}{3}$ of a Pipe of *French* Wine into Quarts, and the reſt into Pints, I deſire to know how many Dozen of each he had?

Anſ. 28 *Dozen of each.*

ALE *and* BEER MEASURE.

98. In 46 Barrels of Beer, how many Pints? *Anſ.* 13248.

99. In 10 Barrels of Ale, how many Gallons and Quarts?

Anſ. 320 *Gallons,* 1280 *Quarts.*

100. In 72 Hogſheads of Beer, how many Barrels?

Anſ. 108 *Barrels:*

101. In 108 Barrels of Beer, how many Hogſheads?

Anſ. 72.

DRY MEASURE.

102. In 120 Quarters of Wheat, how many Buſhels, Pecks, Gallons, and Quarts?

Anſ. 960 *Buſhels,* 3840 *Pecks,* 7680 *Gallons,* 30720 *Quarts.*

103. In 30720 Quarts of Corn, how many Quarters?

Anſ. 120.

104. In 20 Chaldron of Coals, how many Pecks?

Anſ. 2880.

105. In 273 Laſts of Corn, how many Pecks?

Anſ. 87360.

TIME.

106. In 72015 Hours, how many Weeks?

Anſ. 428 *Weeks,* 4 *Days,* 15 *Hours.*

107. How many Days is it ſince the Birth of our Saviour Chriſtmas 1755? *Anſ.* 641013 *Days,* 18 *Hours.*

108. *Stowe* writes, *London* was built 1108 Years before r Saviour's Birth, how many Hours is it ſince to Chriſtas, 1755? *Anſ.* 25097058 *Hours.*

109. From the 17th of *November,* 1738, to the 12th of *tember,* 1739, how many Days? *Anſ.* 299.

110. From the 18th of *July,* 1749, to the 27th of *December*, the ſame Year, how many Days? *Anſ.* 162 *Days.*

111. From the 18th of *July,* 1723, to the 18th of *April,* o, how many Years and Days?

Anſ, 26 *Years,* 9770 *Days, reckoning* 365 *Days,* 6 *Hours,* *ear.*

The SINGLE RULE *of* THREE DIRECT

TEACHETH, by three Numbers given, to find ou fourth, in ſuch Proportion to the third, as the ſeco is to the firſt.

RULE. Firſt ſtate your Queſtion, that is, place yo Number in ſuch Order, that the firſt and third be of o kind, and the ſecond the ſame as the Number require then bring your firſt and third Numbers into one Nam and the ſecond into its loweſt Term mentioned. Multip your ſecond and third Numbers together, and divide t Product by the firſt, the Quotient will be the Anſwer the Queſtion in the ſame Denomination you left your ſ cond Number in.

EXAMPLES.

1. If 1 *lb.* of Sugar coſt 4*d.* ½. what coſt 54 *lb.*

```
1 : 4 ½   ::   54
    4          18
   ——          ——        Anſ. £1 .. – .. 3
   18        4)972
            ——————
            12)243
               ———
           20s. 3d.
```

2. If a Gallon of Ale coſt 3*d.* what is that *per* Barrel? *Anſ.* 8*s.*

3. If a Pair of Shoes coſt 4*s.* 6*d.* what will 12 Doz come to? *Anſ.* £32 .. 8 .. –.

4. If 12 Dozen Pair of Stockings coſt £32 .. 8 .. –, wh is that *per* Pair? *Anſ.* 4*s.* 6*d.*

5. If 1 Yard of Cloth coſt 15*s.* 6*d.* what will 32 Yar coſt at the ſame Rate? *Anſ.* £24 .. 16 .. –.

6. If 32 Yards of Cloth coſt £24 .. 16 .. –, what is t Value of one Yard? *Anſ.* 15*s.* 6*d.*

7. If 1 *lb.* of Sugar coſt 10*d* ½, what is the Worth of *cwt.* *Anſ.* £4 .. 18 .. –.

8. If I gave £4 .. 18 .. –, for 1 *cwt.* of Sugar, at wh Rate did I buy it at per *lb.*? *Anſ.* 10*d.* ½.

9. If I buy 20 Pieces of Cloth, each 20 Ells, for 12*s.* 6 *per* Ell, what is the Value of the Whole? *Anſ.* £25

10. Bought 20 Pieces of Holland, each 20 Ells, f £250, what is that *per* Ell? *Anſ.* 12*s.* 6*d.*

11. What will 25 *cwt*, 3 *qrs.* 14 *lb.* of Tobacco come to at 15*d.* ½ *per lb.?* *Anſ.* £187 .. 3 .. 3.

12. I gave £187 .. 3 .. 3 for 25 *cwt.* 3 *qrs.* 14 *lb.* of Tobacco, at what Rate did I buy it at *per lb.?* *Anſ.* 15*d.* ½.

13. Bought 27 Yards ¼ of Muſlin at 6*s.* 9*d.* ½ *per* Yard, what does it amount to? *Anſ.* £9 .. 5 .. – ¾. 2 *rem.*

14. Bought 17 *cwt.* 1 *qr.* 14 *lb.* of Iron, at 3*d.* ¼ *per lb.* what does it come to? *Anſ.* £26 .. 7 .. –½.

15. If Coffee is ſold for 5*d.* ½ *per* Ounce, what muſt be given for 2 *cwt.?* *Anſ.* £82 .. 2 .. 8.

16. How many Yards of Cloth may be bought for £21 .. 11 .. 1 ½, when 3 Yards ½ coſt £2 .. 14 .. 3? *Anſ.* 27 *Yards*, 3 *Quarters*, 1 *Nail*, 42 *rem.*

17. If 3 *lb.* ½ of *Cheſhire* Cheeſe coſt 1*s.* 1*d.* what coſt 1 *cwt.?* *Anſ.* £1 .. 14 .. 8.

18. If 1 *cwt.* of *Cheſhire* Cheeſe coſt £1 .. 14 .. 8, what muſt I give for 3 *lb.* ½? *Anſ.* 1*s.* 1*d.*

19. Bought 1 *cwt.* 24 *lb.* 8 *oz.* of old Lead, at 9*s.* *per cwt.* what does it come to? *Anſ.* 10*s.* 11*d.* ½. 112 *rem.*

20. If 1 *cwt.* 24 *lb.* 8 *oz.* of Lead be worth 10*s.* 11*d.* ½ $\frac{112}{224}$ what is that *per cwt.?* *Anſ.* 9*s.*

21. If a Gentleman's Income is £500 a Year, and he ſpends 19*s.* 4*d.* *per* Day, how much does he lay by at the Year's End? *Anſ.* £147 .. 3 .. 4.

22. If I buy 14 Yards of Cloth for 10 Guineas, how many Ells *Flemiſh* can I buy for £283 .. 17 .. 6, at the ſame Rate? *Anſ.* 504 *Fl. Ells*, 2 *Quarters.*

23. If £283 .. 17 .. 6 will buy 504 *Flemiſh* Ells, 2 Quarters, what Quantity of Yards can I have for £10 .. 10 .. –? *Anſ.* 14 *Yards.*

24. If 504 *Flemiſh* Ells, 2 Quarters, coſt £283..17..6, at what Rate muſt I give for 14 Yards? *Anſ.* £10..10..–.

25. Gave £1..1..8, for 3 *lb.* of Coffee, what muſt be given for 29 *lb.* 4 *oz.?* *Anſ.* £10 .. 11 .. 3.

26. Bought 29 *lb.* 4 *oz.* of Coffee, for £10..11..3, what is the Value of 3 *lb.?* *Anſ.* £1 .. 1 .. 8.

27. If 1 *oz.* ½ of Coffee coſt 6*d.* ¼, what will 3 *oz.* ¼ coſt at that Rate? *Anſ.* 1*s.* 1*d.* ½. 1 *rem.*

28. If one Ell *Engliſh*, 2 Quarters, coſt 4*s.* 7*d.* what will 39 Yards one Half coſt at the ſame Rate? *Anſ.* £5..3..5 ¼.

29. If 1 Ounce of Gold is worth £5..4..2, what is the Worth of one Grain? *Anſ.* 2*d.* ½. 20 *rem.*

30. If 14 Yards of Broad Cloth coſt £9..12..–, what is the Purchaſe of 75 Yards? *Anſ.* £51 .. 8 .. 6, ¾. 6 *rem.*

31. If 27 Yards of Holland coſt £5 .. 12 .. 6, how many Ells *Engliſh* can I buy for £100? *Anſ.* 384.

32. If 1 *cwt.* coſt £12 .. 12 .. 6. what I muſt give for 14 *cwt.* 1 *qr.* 19 *lb.*? *Anſ.* £182..–..11. $\frac{1}{2}$ 8 *rem.*

33. Bought 7 Yards of Cloth for 17*s.* 8*d.* what muſt be given for 5 Pieces, each containing 27 Yards $\frac{1}{2}$?
Anſ. £17..7..–. $\frac{1}{2}$. 2 *rem.*

34. If 7 *oz.* 11 *dwt.* of Gold be worth £35, what is the Value of 14 *lb.* 9 *oz.* 12 *dwt.* 16 *gr.* at the ſame Rate?
Anſ. £823..9..3 $\frac{3}{4}$. 552 *rem.*

35. A Draper bought 420 Yards of Broad Cloth, at the Rate of 14*s.* 10*d.* $\frac{3}{4}$ *per* Ell *Engliſh*, how much did he pay for the Whole? *Anſ.* £250 .. 5 .. –.

36. A Gentleman bought a Wedge of Gold, which weighed 14 *lb.* 3 *oz.* 8 *dwt.* for the Sum of £514..4..–, at what Rate did he pay for it *per* Ounce? *Anſ.* £3.

37. A Grocer bought 4 Hogſheads of Sugar, each weighing neat 6 *cwt.* 2 *qrs.* 14 *lb.* which coſt him £2..8..6, *per cwt.* what is the Value of the 4 Hogſheads?
Anſ. £64 .. 5 .. 3.

38. A Draper bought 8 Packs of Cloth, each containing 4 Parcels, each Parcel 10 Pieces, and each Piece 26 Yards, and gave after the Rate of £4..16..–, for 6 Yards, I deſire to know what the 8 Packs ſtood him in? *Anſ.* £6656.

39. If 24 *lb.* of Raiſins coſt 6*s.* 6*d.* what will 18 Frails coſt, each weighing neat 3 *qrs.* 18 *lb.*? *Anſ.* £24..17..3.

40. If 1 *oz.* of Silver be worth 5*s.* what is the Price of 14 Ingots, each weighing 7 *lb.* 5 *oz.* 10 *dwt.*? *Anſ.* £313..5.

41. What is the Price of a Pack of Wool weighing 2 *cwt.* 1 *qr.* 19 *lb.* at 8*s.* 6*d.* *per* Stone? *Anſ.* £8..4..6 $\frac{1}{4}$. 10 *rem.*

42. Bought 59 *cwt.* 2 *qrs.* 24 *lb.* of Tobacco, at £2..17..4, *per cwt.* what does it come to? *Anſ.* £171..3..7 $\frac{1}{4}$. 80 *rem.*

43. What is the Half Year's Rent of 547 Acres of Land, at 15*s.* 6*d.* *per* Acre *per Annum*? *Anſ.* £211 .. 19 .. 3.

44. Bought 171 Ton of Lead, at £14 *per* Ton; paid Carriage, and other incident Charges, £4..10..–. I require the Value of the Lead, and what it ſtands me in *per lb.*?
Anſ. £2398..10..–. *Value* 1*d.* $\frac{1}{2}$. 432 *rem. per lb.*

45. If a Pair of Stockings coſt 10 Groats, how many Dozen may I buy for £43..5..–? *Anſ.* 21 *Doz.* 7 *Pair* $\frac{1}{2}$.

46. Bought 27 Dozen, 5 *lb.* of Candles, after the Rate of 17*d.* *per* 3 *lb.* what did they coſt me?
Anſ. £7..15..4 $\frac{1}{4}$. 1 *rem.*

47.

47. If an Ounce of fine Gold is ſold for £3..10..–, what comes 7 Ingots to, each weighing 3 *lb.* 7 *oz.* 14 *dwt.* 21 *gr.* at the ſame Price? *Anſ.* £1071..14..5¼.

48. If my Horſe ſtands me in 9*d.* ½ *per* Day keeping, what will be the Charge of 11 Horſes for the Year? *Anſ.* £158..18..6½.

49. A Factor bought 86 Pieces of Stuff, which coſt him £517..19..4, at 4*s.* 10*d.* *per* Yard, I demand how many Yards there were, and how many Ells *Engliſh* in one Piece? *Anſ.* 2143 *Yards* ¼. 14 *rem. and* 19 *Ells,* 4 *Quarters,* 2 *Nails,* 64 *rem. in a Piece.*

50. A Gentleman hath an Annuity of £896..7..– *per Annum,* I deſire to know how much he may ſpend daily, that at the Year's End he may lay up 200 Guineas, and give to the Poor quarterly 10 Moidores? *Anſ.* £1..14..8. 44 *rem.*

The RULE *of* THREE INVERSE.

INVERSE PROPORTION is, when *more* requires *leſs,* and *leſs* requires *more.* *More* requires *leſs,* is when the third Term is *greater* than the *firſt,* and requires the *fourth Term* to be *leſs* than the *ſecond.* And *leſs* requires *more,* is when the *third* Term is *leſs* than the *firſt,* and requires the *fourth* Term to be *greater* than the *ſecond.*

RULE. Multiply the firſt and ſecond Terms together, and divide the Product by the third, the Quotient will bear ſuch Proportion to the ſecond as the firſt does to the third.

EXAMPLES.

1. If 8 Men can do a Piece of Work in 12 Days, how many Days can 16 Men perform the ſame in? *Anſ.* 6 *Days.*

8 : 12 : : 16 : 6
8
—
16)96(6 *Days.*

2. If 54 Men can build a Houſe in 90 Days, how many Men can do the ſame in 50 Days? *Anſ.* 97 *Men* ⅕.

3. If, when a Peck of Wheat is ſold for 2*s.* the Penny Loaf weighs 8 *oz.* how much will it weigh when the Peck is worth but 1*s.* 6*d.*? *Anſ.* 10 *oz.* 10 *dr.* ⅔.

4. How many Pieces of Money of 20*s.* Value are equal to 240 Pieces of 12*s.* each? *Anſ.* 144.

5. How

5. How many Yards of 3 Quarters wide are equal i
Meaſure to 30 Yards of 5 Quarters wide ?

Anſ. 50.

6. If I lend my Friend £200 for 12 Months, how lon
ought he to lend me £150 to requite my Kindneſs ?

Anſ. 16 Months.

7. If for 24*s.* I have 1200 *lb.* carried 36 Miles, how
many Pounds can I have carried 24 Miles for the ſam
Money ? *Anſ.* 1800 *lb.*

8. If 100 Workmen finiſh a Piece of Work in 12 Days,
how many are ſufficient to do it in 3 Days ?

Anſ. 400.

9. An Army beſieging a Town, in which were 100
Soldiers, with Proviſions for 3 Months, how many Soldie
departed, when the Proviſions laſted them 6 Months ?

Anſ. 500.

10. If £20 worth of Wine is ſufficient to ſerve an Ordi
nary of 100 Men, when the Tun is ſold for £30, how man
will £20 worth ſuffice, when the Tun is ſold for but £24

Anſ. 125 Men.

11. A Courier makes a Journey in 24 Days, when th
Day is but 12 Hours long; how many Days will he be go
ing the ſame Journey, when the Days are 16 Hours long?

Anſ. 18 Days.

12. How much Pluſh is ſufficient for a Cloak, which ha
in it 4 Yards of 7 Quarters wide of Stuff for the Lining, th
Pluſh being but 3 Quarters wide.

Anſ. 9 *Yards* $\frac{1}{3}$.

13. If 14 Pioneers make a Trench in 18 Days, ho
many Days will 34 take to do the ſame ?

Anſ. 7 *Days*, 4 *Hours*, 56 *Minutes*, 16 *rem.*

14. Borrowed of my Friend £64 for 8 Months, and h
hath Occaſion another Time to borrow of me for 12 Month
how much muſt I lend him to requite his former Kindne
to me ? *Anſ.* £42..13..4.

15. A Regiment of Soldiers conſiſting of 1000 Men a
to have new Coats, each Coat to contain 2 Yards $\frac{1}{2}$ of Clo
5 Quarters wide, and to be lined with Shalloon of 3 Qua
ters wide, I demand how many Yards of Shalloon will li
them ? *Anſ.* 4166 *Yards*, 2 *Quarters*, 2 *Nails*, 2 *re*

The DOUBLE RULE *of* THREE

IS ſo called, becauſe it is compoſed of 5 Numbers given to find a ſixth ; which, if the Proportion is *direct*, muſt bear ſuch Proportion to the 4th and 5th, as the 3d bears to he 1ſt and 2d. But if *inverſe*, the 6th Term muſt bear ſuch Proportion to the 4th and 5th, as the firſt bears to the 2d and 3d. The three firſt Terms are a Suppoſition ; the two laſt, a Demand.

RULE 1. Let the principal Cauſe of *Loſs* or *Gain*, *Intereſt* or *Decreaſe*, *Action* or *Paſſion*, be put in the firſt Place.

2. Let that which betokeneth *Time*, *Diſtance* of Place, and the like, be in the ſecond Place, and the remaining one in the Third.

3. Place the other two Terms under their like in the Suppoſition.

4. If the *Blank* falls under the *third* Term, multiply the *firſt* and *ſecond* Terms for a *Diviſor*, and the other *three* for a *Dividend*. But,

5. If the *Blank* falls under the *firſt* or *ſecond* Term, multiply the *third* and *fourth* Terms for a *Diviſor*, and the other three for the *Dividend*, and the Quotient will be the *Anſwer*.

PROOF, by two ſingle Rules of Three.

EXAMPLES.

1. If 14 Horſes eat 56 Buſhels of Oats in 16 Days, how many Buſhels will be ſufficient for 20 Horſes 24 Days ?

By two ſingle Rules,
Hor. Bu. Hor. Bu.
1. *As* 14 : 56 : : 20 : 80
Days. Bu. Days. Bu.
2. *As* 16 : 80 : : 24 : 120

or in one Stating. *Worked thus*
Ho. Days. Bu.
14 : 16 : 56
20 : 24 : —

$$\frac{56\times20\times24}{14\times16}=120$$

2. If 8 Men in 14 Days can mow 112 Acres of Graſs, how many Men muſt there be to mow 2000 Acres in 10 Days ?

Acres. Days. Acres. Days.
1. *As* 112 : 14 :: 2000 : 250
Days. Men, Days. Men.
2. *As* 250 : 8 :: 10 : 200

M. D. Acres.
8 : 14 : 112
– : 10 : 2000

$$\frac{8\times14\times2000}{112\times10}=200$$

3. If

3. If £100, in 12 Months, gain £6 Intereſt, how much will £75 gain in 9 Months? *Anſ.* £3..7..6.

4. If a carrier receives £2..2..– for the Carriage of 3 *cwt.* 150 Miles, how much ought he to receive for the Carriage of 7 *cwt.* 3 *qrs.* 14 *lb.* for 50 Miles? *Anſ.* £1..16..9.

5. If a Regiment of Soldiers, conſiſting of 136 Men, conſume 351 Quarters of Wheat in 108 Days, how many Quarters of Wheat will 11232 Soldiers conſume in 56 Days? *Anſ.* 15031.

6. If 40 Acres of Graſs be mowed by 8 Men in 7 Days, how many Acres can be mowed by 24 Men in 28 Days? *Anſ.* 480.

7. If 40*s.* will pay 8 Men for 5 Days Work, how much will pay 32 Men for 24 Days Work? *Anſ.* £38..8..–.

8. If £100, in 12 Months, gain £6 Intereſt, what Principal will gain £3..7..6 in 9 Months? *Anſ.* £75.

9. If a Regiment conſiſting of 939 Soldiers conſume 351 Quarters of Wheat in 168 Days, how many Soldiers will conſume 1404 Quarters in 56 Days? *Anſ.* 11268.

10. In a Family conſiſting of 7 Perſons, there are drank out 2 Kilderkins of Beer in 12 Days, how many Kilderkins will there be drank out by another Family of 14 Perſons in 8 Days? *Anſ.* 2 *Kilderkins,* 12 *Gallons.*

11. If the Carriage of 60 *cwt.* 20 Miles coſt £14..10..–, what Weight can I have carried 30 Miles for £5..8..9, at the ſame Rate of Carriage? *Anſ.* 15 *cwt.*

12. If 2 Horſes eat 8 Buſhels of Oats in 16 Days, how many Horſes will eat up 3000 Quarters in 24 Days? *Anſ.* 4000.

13. If £100, in 12 Months, gain £7 Intereſt, what is the Intereſt of £571 for 6 Years? *Anſ.* £239..16..4

14. If I pay 10*s.* for the Carriage of 2 Ton 6 Miles, what muſt I pay for the Carriage of 12 Ton, 17 *cwt.* 17 Miles? *Anſ.* £9..2..–½

PRACTICE

IS ſo called from the general Uſe thereof by all Perſons concerned in Trade and Buſineſs.

All Queſtions in this Rule are performed by taking aliquot, or even Parts, by which Means many tedious Reductions are avoided, the Table of which is as follows:

Of a Pound.		*Of a Shilling.*		*Of a Tun.*		*Of an Hundred.*	
. *d.*		*d.*		*cwt.*		*qrs. lb.*	
0..– is	$\frac{1}{2}$	6 is	$\frac{1}{2}$	10 is	$\frac{1}{2}$	2 or 56 is	$\frac{1}{2}$
6..8	$\frac{1}{3}$	4	$\frac{1}{3}$	5	$\frac{1}{4}$	1 or 28	$\frac{1}{4}$
5..–	$\frac{1}{4}$	3	$\frac{1}{4}$	4	$\frac{1}{5}$	14	$\frac{1}{8}$
4..–	$\frac{1}{5}$	2	$\frac{1}{6}$	2 $\frac{1}{2}$	$\frac{1}{8}$	*Of a Quarter.*	
3..4	$\frac{1}{6}$	1 $\frac{1}{2}$	$\frac{1}{8}$	2	$\frac{1}{10}$	14	$\frac{1}{2}$
2..6	$\frac{1}{8}$	1	$\frac{1}{12}$			7	$\frac{1}{4}$
2..–	$\frac{1}{10}$					4	$\frac{1}{7}$
1..8	$\frac{1}{12}$					3 $\frac{1}{2}$	$\frac{1}{8}$

RULE 1. When the *Price* is leſs than a *Penny*, divide by the aliquot Parts that are in a *Penny*; then by 12 and 20, it will give the Anſwer.

$\frac{1}{4}$ is $\frac{1}{4}$ 5704 *lb.* at $\frac{1}{4}$ 15)1426 2|0)11|8..10 £5..18..10	7695 at $\frac{1}{2}$ *Facit* £16..–..7 $\frac{1}{2}$	6547 at $\frac{3}{4}$ *Facit* £20..9..2 $\frac{1}{4}$
	5740 at $\frac{1}{2}$ *Facit* £11..19..2	4573 at $\frac{3}{4}$ *Facit* £14..5..9 $\frac{3}{4}$

RULE 2. When the *Price* is leſs than a *Shilling*, take the aliquot Part or Parts that are in a *Shilling*, add them together, and divide them by 20, as before.

1 is $\frac{1}{12}$ 7547 at 1*d.* 2|0)62|8..11 £31..8..11	6254 at 1*d.* $\frac{3}{4}$ *Facit* £45..12–..$\frac{1}{2}$	7062 at 3*d.* $\frac{1}{4}$ *Facit* £95..12..7$\frac{1}{2}$
	2351 at 2*d.* *Facit* £19..11..10	2147 at 3*d.* $\frac{1}{2}$ *Facit* £31..6..2 $\frac{1}{2}$
1 is $\frac{1}{12}$ 3751 at 1*d* $\frac{1}{4}$ $\frac{1}{4}$ is $\frac{1}{4}$)312..7 78..1 $\frac{3}{4}$ 2|0)39|0..8 $\frac{3}{4}$ £19..10..8 $\frac{3}{4}$	7210 at 2*d.* $\frac{1}{4}$ *Facit* £67..11..10$\frac{1}{2}$	7000 at 3*d.* $\frac{3}{4}$ *Facit* £109..7..6
	2710 at 2*d.* $\frac{1}{2}$ *Facit* £28..4..7	3257 at 4*d.* *Facit* £54..5..8
	3250 at 2*d.* $\frac{3}{4}$ *Facit* £37..4..9$\frac{1}{2}$	2056 at 4*d.* $\frac{1}{4}$ *Facit* £36..8..2
54325 at 1*d.* $\frac{1}{2}$ *acit* £339..10..7$\frac{1}{2}$	2715 at 3*d.* *Facit* £33..18..9	3752 at 4*d.* $\frac{1}{2}$ *Facit* £70..7..–.

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2107 at 4*d.* ¾ *Facit* £41 .. 14 .. – ¼	3254 at 7*d.* ¼ *Facit* £98 .. 5 .. 11 ½	2150 at 9*d.* ¾ *Facit* £87 .. 6 .. 10
3210 at 5*d.* *Facit* £66 .. 17 .. 6	2701 at 7*d.* ½ *Facit* £84 .. 8 .. 1 ½	6325 at 10*d.* *Facit* £263 .. 10 ..
2715 at 5*d.* ¼ *Facit* £59 .. 7 .. 9 ¾	3714 at 7 *d.* ¾ *Facit* £119 .. 18 .. 7½	5724 at 10*d.* ¼ *Facit* £244 .. 9 .. 3
3120 at 5*d.* ½ *Facit* £71 .. 10 .. –	2710 at 8*d.* *Facit* £90 .. 6 .. 8	6327 at 10*d.* ¼ *Facit* £270 .. 4 .. 3
7521 at 5*d.* ¾ *Facit* £180 .. 3 .. 9 ¾	3514 at 8*d.* ¼ *Facit* £120 .. 15 .. 10½	3254 at 10*d.* ½ *Facit* £142 .. 7 ..
3271 at 6*d.* *Facit* £81 .. 15 .. 6	2759 at 8*d.* ½ *Facit* £97 .. 14 .. 3 ½	7291 at 10*d.* ¾ *Facit* £326 .. 11 ..
7914 at 6*d.* ¼ *Facit* £206 .. 1 .. 10½	9872 at 8*d.* ¾ *Facit* £359 .. 18 .. 4	3256 at 11*d.* *Facit* £149 .. 4 ..
3250 at 6*d.* ½ *Facit* £88 .. – .. 5	5272 at 9*d.* *Facit* £197 .. 14 .. –	7254 at 11*d.* ¼ *Facit* £340 .. – ..
2708 at 6*d.* ¾ *Facit* £76 .. 3 .. 3	6325 at 9*d.* ¼ *Facit* £243 .. 15 .. 6¼	3754 at 11*d.* ½ *Facit* £179 .. 17
3271 at 7*d.* *Facit* £95 .. 8 .. 1	7924 at 9*d.* ½ *Facit* £313 .. 13 .. 2	7972 at 11*d.* ¾ *Facit* £390 .. 5 ..

RULE 3. When the *Price* is more than a *Shilling*, and l than *two*, take the Part or Parts, with ſo much of the gi *Pr ce* as is more than a *Shilling*, which add to the gi *Quantity*, and divide by 20, it will give the Anſwer.

¼ 1/48 2106 at 12*d.* ¼ 43 .. 10½ 2|0)214|9 .. 10½ 107 .. 9 .. 10½	½ 1/24 3715 at 12*d.* ½ 154 .. 9 ½ 2|0)386|9 .. 9 ½ 193 .. 9 .. 9 ½	2712 at 12*d.* ¾ *Facit* £144 .. 1 2107 at 1*s.* 1 *Facit* £114 .. 2

3215 at 1*s.* 1*d.* ¼
Facit £177. 9..10¾

2790 at 1*s.* 1*d.* ½
Facit £156..18..9

7904 at 1*s.* 1*d.* ¾
Facit £452..16..8

3750 at 1*s.* 2*d.*
acit £218..15..–

3291 at 1*s.* 2*d.* ¼
acit £195..8..0¾

9254 at 1*s.* 2*d.* ½
acit £559..1..11

7250 at 1*s.* 2*d.* ¾
acit £445..11..5½

7591 at 1*s.* 3*d.*
acit £474..8..9

6325 at 1*s.* 3*d.* ¼
acit £401..18..–¼

5271 at 1*s.* 3*d.* ½
acit £340..8..4½

3254 at 1*s.* 3*d.* ¾
cit £213..10..10½

2915 at 1*s.* 4*d.*
cit £194..6..8

3270 at 1*s* 4*d.* ¼
cit £221..8..1½

7059 at 1*s.* 4*d.* ½
cit £485..6..1½

2750 at 1*s.* 4*d.* ¾
cit £191..18..6½

3725 at 1*s.* 5*d.*
Facit £263..17..1

7250 at 1*s.* 5*d.* ¼
Facit £521..1..10½

2597 at 1*s.* 5*d.* ½
Facit £189..7..3½

7210 at 1*s.* 5*d.* ¾
Facit £533..4..9½

7524 at 1*s.* 6*d.*
Facit £564..6..–

7103 at 1*s.* 6*d.* ¼
Facit £540..2..5¾

3254 at 1*s.* 6*d.* ½
Facit £250..16..7

7925 at 1*s.* 6*d.* ¾
Facit £619..2..9¾

9271 at 1*s.* 7*d.*
Facit £733..19..1

7210 at 1*s.* 7*d.* ¼
Facit £578..6..–½

2310 at 1*s.* 7*d.* ½
Facit £187..13..9

2504 at 1*s.* 7*d.* ¾
Facit £206..1..2

7152 at 1*s.* 8*d.*
Facit £596..–..–

2905 at 1*s.* 8*d.* ¼
Facit £245..2..2¼

7104 at 1*s.* 8*d.* ½
Facit £606..16..–

1004 at 1*s.* 8*d.* ¾
Facit £86..16..1

2104 at 1*s* 9*d.*
Facit £184..2..–

2571 at 1*s.* 9*d.* ¼
Facit £227..12..9¾

2104 at 1*s.* 9*d.* ½
Facit £188..9..8

7506 at 1*s.* 9*d.* ¾
Facit £680..4..7½

1071 at 1*s.* 10*d.*
Facit £98..3..6

5200 at 1*s.* 10*d.* ¼
Facit £482..1..8.

2117 at 1*s.* 10*d.* ½
Facit £198..9..4½

1007 at 1*s.* 10*d.* ¾
Facit £95..9..1¼

5000 at 1*s.* 11*d.*
Facit £479..3..4

2105 at 1*s.* 11*d.* ¼
Facit £203..18..5¼

1006 at 1*s.* 11*d.* ½
Facit £98..10..1

2705 at 1*s.* 11*d.* ¾
Facit £267..13..7¾

5000 at 1*s.* 11*d.* ½
Facit £489..11..8

4000 at 1*s.* 11*d.* ¾
Facit £395..16..8

RULE 4. When the *Price* conſiſts of any even Number o *Shillings* under 20, multiply the given *Quantity* by Half th *Price*, doubling the firſt Figure of the Product for *Shilling* and the reſt of the Product will be *Pounds*.

2750 at 2*s*. *Facit* £275 .. – .. –	2102 at 10*s*. *Facit* £1051 .. – .. –	1075 at 16*s*. *Facit* £860 .. – ..
3254 at 4*s*. *Facit* 650 .. 16 .. –	2101 at 12*s*. *Facit* £1260 .. 12 .. –	1621 at 18*s*. *Facit* £1458 .. 18 ..
2710 at 6*s*. *Facit* £813 .. – .. –	5271 at 14*s*. *Facit* £3689 .. 14 .. –	Note, *When th Price is* 10*s*. *ta Half of the Quantit and if any remain it is* 10s.
1572 at 8*s*. *Facit* £628 .. 16 .. –	3123 at 16*s*. *Facit* £2498 .. 8 .. –	

RULE 5. When the *Price* conſiſts of odd *Shillings*, mul tiply the given Quantity by the *Price*, and divide by 2 the Product will be the Anſwer.

2703 at 1*s*. *Facit* £135 .. 3 .. –	2715 at 7*s*. *Facit* £950 .. 5 .. –	2150 at 15*s*. *Facit* £1612 .. 10 ..
3270 at 3*s*. 3 2|0)981|0 £490 .. 10 .. –	3214 at 9*s*. *Facit* £1446 .. 6 .. –	3142 at 17*s*. *Facii* £2670 .. 14 ..
	2710 at 11*s*. *Facit* £1490 .. 10 .. –	2150 at 19*s*. *Facit* £2042 .. 10 ..
3271 at 5*s*. *Facit* £817 .. 15 .. –	3179 at 13*s*. *Facit* £2066 .. 7 .. –	7157 at 19*s*. *Facit* £6799 .. 3 ..

Note, *When the Price is* 5*s*. *divide t Quantity by* 4, *and if any remains it is* 5*s*.

RULE 6. When the *Price* is *Shillings*, and *Pence*, and th the aliquot part of a *Pound*, divide by the aliquot Part, an it will give the Anſwer at once; but if they are not an al quot Part, then multiply the *Quantity* by the *Shillings*, an take Parts for the reſt, add them together, and divide by 2

6*s*. 8

.d. 6.8 | ⅓ | 2710 at 6*s.* 8*d.*

£903 .. 6 .. 8

3150 *at* 3*s.* 4*d.*
Facit £525 .. – .. –

2715 at 2*s.* 6*d.*
Facit £339 .. 7 .. 6

7150 at 1*s.* 8*d.*
Facit £595 .. 16 .. 8

3215 at 1*s.* 4*d.*
Facit £214 .. 6 .. 8

7211 at 1*s.* 3*d.*
Facit 450 .. 13 .. 9

d. 2 | ⅙ | 2710 at 3*s.* 2*d.*
3

8130
451 .. 8

2|0 | 858|1 .. 8

£429 .. 1 .. 8

7514 at 4*s.* 7*d.*
Facit £1721 .. 19 .. 2

2517 at 5*s.* 3*d.*
Facit £660 .. 14 .. 3

2547 at 7*s.* 3*d.* ½
Facit £928 .. 11 .. 10½

3271 at 5*s.* 9*d.* ¼
Facit £943 .. 16 .. 4¾

2103 at 15*s.* 4*d.* ½
Facit £1616 .. 13 .. 7½

7152 at 17*s.* 6*d.* ¾
Facit £6280 .. 7 .. –

2510 at 14*s.* 7*d.* ¼
Facit £1832 .. 16 .. 5½

3715 at 9*s.* 4*d.* ½
Facit £1741 .. 8 .. 1½

2572 at 13*s.* 7*d.* ½
Facit £1752 .. 3 .. 6

7251 at 14*s.* 8*d.* ¼
Facit £5324 .. 19 .. –¾

3210 at 15*s.* 7*d.* ¾
Facit £2511 .. 3 .. 1½

2710 at 19*s.* 2*d* ½
Facit £2602 .. 14 .. 7

RULE 7. 1*ſt.* When the *Price* is *Pounds* and *Shillings*, ultiply the Quantity by the *Pounds*, and proceed with the *illings*, if they are even, as in the 4th *Rule*; if odd, ke the aliquot Parts, add them together, the Sum will the Anſwer.

2*dly.* When *Pounds*, *Shillings* and *Pence*, and the *Shillings* d *Pence* the Aliquot Part of a *Pound*, multiply the uantity by the *Pounds*, and take Parts for the reſt.

3*dly.* When the *Price* is *Pounds*, *Shillings*, *Pence* and *Far- ings*, and the *Shillings* and *Pence* not the Aliquot Parts of *Pound*, reduce the *Pounds* and *Shillings* into *Shillings*, multiply

multiply the Quantity by the *Shillings*, take Parts for the rest, add them together, and divide by 20.

Note, *When the given Quantity is no more than three Figures, proceed as in* Compound Multiplication.

4	⅕	7215 at £7 .. 4 .. –
		7
		50505
		1443
		51948£.
s. d.		
2 .. 6	⅛	2104 at £5 .. 3 .. –
		5
		10520
6	⅕	263
		52 .. 12
		10835 .. 12
		2107 at £2 .. 8 .. –
		Facit £5056 .. 16 .. –
		7156 at £5 .. 6 .. –
		Facit £37926 .. 16 .. –
6	½	2710 at £2 .. 3 .. 7½
		43
1½	¼	116530
		1355
		338 .. 9
	2,0	11822|3 .. 9
		£5911 .. 3 .. 9
		3215 at £1 .. 17 .. –
		Facit £5947 .. 15 .. –

2107 at £1 .. 13 ..
Facit £3476 .. 11 ..

3215 at £4 .. 6 .. 8
Facit £13931 .. 13 ..

2154 at £7 .. 1 .. 3
Facit £15212 .. 12 ..

2701 at £2 .. 3 ..
Facit £5852 .. 3 ..

2715 at £1 .. 17 .. 2
Facit £5051 .. – .. 7

2157 at £3 .. 15 .. 2
Facit 8108 .. 19 .. 5

3210 at £1 .. 18 .. 6
Facit £6189 .. 5 .. 7

2157 at £2 .. 7 .. 4
Facit £5109 .. 7 .. 10

142 at £1 .. 15 .. 2
Facit £250 .. 2 .. 6

95 at £15 .. 14 .. 7
Facit £1494 .. 7 .. 4

37 at £1 .. 19 .. 5
Facit £73 .. – .. 8

2175 at £2 .. 15 .. 4
Facit £6022 .. – .. 7

2150 at £17 .. 16 ..
Facit £38283 .. 8 ..

RULE 8. When the *Price* and Quantity given are of ſeveral *Denominations,* multiply the *Price,* by the *Integers,* and take Part with the Parts of the *Integers* for the reſt.

At £3 .. 17 .. 6 *per cwt.* what is the Value of 25 *cwt.* 2 *qrs.* 14 *lb.* of Tobacco?

qrs.		
2	½	£3 .. 17 .. 6
		5
		19 .. 7 .. 6
		5
lb.		96 .. 17 .. 6
14	¼	1 .. 18 .. 8
		9 .. 8¼
		99 .. 5 .. 11¼

5×5=25

37
1
2

1..4..9
8
9..18..0
2
21..
6..2..4
3..1

2. At £1..4..9 *per cwt.* what comes 17 *cwt.* 1 *qr.* 17 *lb.* of Cheeſe to? *Anſ.* £21..10..8

3. Sold 85 *cwt.* 1 *qr.* 10 *lb.* of Cheeſe at £1 .. 7 .. 8 *per cwt.* what does it come to? *Anſ.* £118..1..–½

4. Hops at £4..5..8 *per cwt.* what muſt be given for 72 *cwt.* 1 *qr.* 18 *lb*? *Anſ.* £310..3..2

5. At £1..1..4 *per cwt.* what is the Value of 27 *cwt.* 2 *qrs.* 15 *lb.* of *Malaga* Raiſins? *Anſ.* £29. 9..6¼

6. Bought 78 *cwt.* 3 *qrs.* 12 *lb.* of *Currants,* at £2..17..9 *per cwt.* what did I give for the Whole? *Anſ.* £227..14..–.

7. Sold 56 *cwt.* 1 *qr.* 17 *lb.* of Sugar, at £2..15..9 the *cwt.* what does it come to? *Anſ.* £157..4..4½

8. Tobacco at £3..17..10 the *cwt.* what is the Worth of 97 *cwt.* 15 *lb.*? *Anſ.* £378 . – ..3

9. At £4..14..6 the *cwt.* what is the Value of 37 *cwt.* 2 *qrs.* 13 *lb.* of double refined Sugar? *Anſ.* £177..14..8½

10. Bought Sugar at £3..14..6 the *cwt.* what did I give for 15 *cwt.* 1 *qr.* 10 *lb.*? *Anſ.* £57..2..9

11. At £4..15..4 the *cwt.* the Value of 172 *cwt.* 3 *qrs.* 12 *lb.* of Tobacco is required? *Anſ.* £823..19..–¼

12. Soap at £3..11..6 the *cwt.* what is the Value of 53 *cwt.* 17 *lb.*? £190..–..4.

INTEREST.

INTEREST is either SIMPLE or COMPOUND.

SIMPLE INTEREST

IS the PROFIT allowed in the lending or Forbearance of any Sum of Money for a determined Space of *Time.*

The PRINCIPAL is the Money lent, for which *Intereſt* is to be received.

The RATE *per* CENT is a certain *Sum* agreed on between the *Borrower* and the *Lender,* to be paid for every £100 for the uſe of the *Principal* 12 Months.

The AMOUNT is the *Principal* and *Intereſt* added together.

INTEREST is alſo applied to *Commiſſion, Brokage, Purchaſing of Stocks* and *Inſurance.*

To find the Intereſt of any Sum of Money for a Year.

RULE 1. Multiply the *Principal* by the *Rate per Cent.* that Product divided by 100, will give the Intereſt required.

For ſeveral Years.

Multiply the *Intereſt* of one *Year* by the number of *Years* given in the Queſtion, and the Product will be the Anſwer.

EXAMPLES.

1. What is the Intereſt of £375 for a Year, at 5 *per Cent per Annum.*

```
    5
  ———
 18|75
    20
  ———
 15|00
```

Anſ. £18..15.–

2. What is the Intereſt of £268 for one Year at £4 *per Cent. per Annum?* *Anſ.* £ 10..14..4$\frac{3}{4}$

3. What is the Intereſt of £945..10..– for a Year, at £4 *per Cent. per Annum?* *Anſ.* £37..16..4$\frac{3}{4}$

4. What is the Intereſt of £547..15..– at £5 *per Cent per Annum,* for three Years? *Anſ.* £82..3..3.

5. What

5. What is the Intereſt of £254..17..6 for 5 Years, at £4 *per Cent. per Annum?* *Anſ.* £50..19..$5\frac{3}{4}$

6. What is the Intereſt of £556..13..4 at 5 *per Cent. per Annum* for 5 Years? *Anſ.* £139..3..4.

COMMISSION

Is an Allowance from *Merchants* to their *Factors* or *Correſpondents* in the buying or ſelling of Goods, and is generally at a certain *Rate per Cent.* according to the Cuſtom of the Country where the *Factor* reſides.

RULE. Multiply the *Principal* by the *Rate per Cent.* as before; and for $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$, take the *Part* or *Parts* from the *Principal*, which added to the Product, and divided by 100, will give the Anſwer.

7. What is the Commiſſion of £287..10..–, at $3\frac{1}{2}$ *per Cent.*?

$\frac{1}{2}$, $\frac{1}{2}$, 287..10
3
Anſ. £10..1..3.

862..10 = 3
143..15 = $\frac{1}{2}$

10|06.. 5 = $3\frac{1}{2}$
20

1|25
12

3|00

8. What muſt I allow my Correſpondent for diſburſing on my Account £529.. 18..5 at $2\frac{1}{4}$ *per cent?* *Anſ.* £11..18..$5\frac{1}{2}$

9. My Correſpondent writes me Word, that he has bought Goods to the Amount of £754..16..– on my Account, what does his Commiſſion come to at $2\frac{1}{2}$ *per Cent.?* *Anſ.* £18..17..$4\frac{3}{4}$

10. If I allow my Factor $3\frac{3}{4}$ *per Cent.* for Commiſſion, what may he demand on the laying out £876..5..10? *Anſ.* £32..17..$2\frac{1}{2}$

PURCHASING *of* STOCKS.

RULE. Multiply the *Sum* to be purchaſed by the Exceſs, above 100, that Product divide by 100, the Produce of which added to the given *Sum* is the Purchaſe required.

If

If under *Par* (that is under £100) multiply by the *Rate per Cent.* that Product divided by 100, gives the *Purchaſe* thereof.

11. What is the Purchaſe of £575..10..– Bank Stock, at 131 ¾ *per Cent?*

6×5+1=31

575..10
6

3453
5

17265..—..–=30
½ ½ 575..10..–= 1
¼ ½ 287..15..–= ½
143..17..6= ¼

182|72..2..6 = 31 ¾
20

14|42
12

5|10

575..10..–
182..14..5

758..4..5 *Anſwer.*

12. What is the Purchaſe of £254..17..—Bank Annuities, at 97 ¼ *per Cent?*

12×8+1=97

254..17
12

3058..4
8

24465..12..–=96
¼ ¼ 254..17..–= 1
63..14..3= ¼

247|84.. 3..3=97¼
20

16|83
12

9|99
4

3|96

£247..16..9 ¾ *Anſwer.*

13. At 110¼ *per Cent.* what is the Purchaſe of £2054..16..– South Sea Stock? *Anſ.* £2265..8..4

14. At £104 ⅜ *per Cent.* South Sea Annuities, what is the Purchaſe of £1797..14..–? *Anſ.* £1876..6..11

15. What is the Purchaſe of £2750..17..–South Sea Old Annuities, at 102 ⅝ *per Cent?* *Anſ.* £2823..1..2 ¼

16. At £96 ¾ *per Cent.* what is the Purchaſe of £577..19..– Bank Annuities? *Anſ.* £559..3..3 ¾

17. At 124 ⅝ *per Cent.* what is the Purchaſe of £758..17..1 India Stock? *Anſ.* £945..15..4 ¼

B R O

B R O K A G E

Is an Allowance to *Brokers* for helping *Merchants* or *Factors* to Perſons to buy or ſell them Goods.

RULE. Divide the Sum given by 100, and take Parts from the Quotient with the *Rate per Cent.*

18. If I employ a Broker to ſell Goods for me to the Value of £2575..17..6, what is the Brokage at 4*s. per cent?*

25|75..17..6
20
—
15|17
12
—
2|10

4*s* $\frac{1}{5}$ 25..15..2
Anſwer, 5.. 3..–$\frac{1}{4}$

19. What is the Brokage of £796..14..7. at 6*s. per cent?*
Anſ. £2..7..9 $\frac{1}{2}$

20. When a Broker ſells Goods to the Amount of £7105..5..10, what may he demand for Brokage, if he is allowed 5*s.* 6*d. per cent?* *Anſ.* £19..10..9 $\frac{1}{4}$

21. If a Broker is employed to buy a Quantity of Goods to the Value of £975..6..4, what is the Brokage at 6*s.* 6*d. per Cent?* *Anſ.* 3..3..4 $\frac{1}{2}$

When the Time is the $\frac{1}{4}$, $\frac{1}{2}$, or $\frac{3}{4}$ of a Year, beſides a Number of Years given.

RULE. Take Parts of the *Intereſt* of one *Year*, which add to the *Intereſt* of the ſeveral *Years* given, and it will give the Anſwer.

22. What is the Intereſt of £554..10 .– for 3 Months, at 4 *per Cent. per Annum?*

554..10
4
—
22|18
20
—
3|60
12
—
7|20

m.
3 $\frac{1}{4}$ 22.. 3.. 7
Anſ. 5..10..10 $\frac{3}{4}$

23. What is the Intereſt of £336..15..6, for 2 Years $\frac{3}{4}$ at 5 *per cent. per Annum?*

336..15..6
5
—
16|83..17..6
20
—
16|77
12
—
9|30
4
—
1|20

16..16..9 $\frac{1}{4}$
2
—
33..13..6 $\frac{1}{2}$
$\frac{1}{2}$ $\frac{1}{2}$ 8.. 8..4 $\frac{1}{2}$
$\frac{1}{4}$ $\frac{1}{2}$ 4.. 4..2 $\frac{1}{4}$
—
46.. 6..1 $\frac{1}{4}$

24. What

24. What is the Intereſt of £325..7..6, at 6 *per Cent. pe* *Annum*, for 3 Years and a Half? *Anſ.* £68..6..6 $\frac{1}{4}$

25. What is the Intereſt of £547..2..4, for 5 Years and a Half, at 4 *per Cent. per Annum?* *Anſ.* £120..7..3$\frac{1}{4}$

26. What is the Intereſt of £257..5..1, at 4 *per Cent.* fo 1 Year and three Quarters? *Anſ.* £18..–..1$\frac{1}{2}$

27. What is the Intereſt of £479..5..–, for 5 Years, one Quarter, at 5 *per Cent. per Annum?* *Anſ.* £125..16..–

When the Rate per Cent. *is* $\frac{1}{4}$, $\frac{1}{2}$, *or* $\frac{3}{4}$ *more than the Pound* *given in the Rate,* proceed as in Commiſſion, and it wil give the *Anſwer* for 1 *Year,* and for *ſeveral* proceed as in the laſt Rule.

28. What is the Intereſt of £175..17..–, for 2 Years an 3 Quarters, at 4 $\frac{1}{2}$ *per Cent?*

$\frac{1}{2}$ $\frac{1}{2}$ 175..17
4
703.. 8..–
87..18..6
7|91..6..6
20
18|26
12
3|18

$\frac{1}{2}$ $\frac{1}{2}$ 7..18..3
2
15..16..6
$\frac{1}{4}$ $\frac{1}{2}$ 3..19..1$\frac{1}{2}$
1..19..6$\frac{3}{4}$
21..15..2$\frac{1}{4}$ *Anſ.*

29. What is the Intereſt of £397..9..5, for 2 Years an 1 Quarter, at 3 $\frac{1}{2}$ *per Cent. per Annum?* *Anſ.* £31..6..–.

30. What is the Intereſt of £576..2..7, for 7 Years on Quarter, at 4 $\frac{1}{2}$ *per Cent. per Annum?* *Anſ.* £187..19..1

31. What is the Intereſt of £279..13..8, at 5 $\frac{1}{4}$ *per Cen* *per Annum,* for 3 Years and a Half? *Anſ.* £51..7..10.

When the Intereſt is required for any Number of Weeks.

RULE. As 52 *Weeks* are to the *Intereſt* of the given *Sum* fo a Year: ſo are the Weeks given, to the Intereſt required.

32. Wha

32. What is the Intereſt of £379..13..2 for 4 Weeks, 4 *per Cent. per Annum?*

w. *w.*
As 52 : 15..3 :8$\frac{1}{2}$: : 4 :
20
303
12
3644
4
14578
4
4)
52)58312)1121
52
12)280$\frac{1}{4}$
63
52 2|0)3..4$\frac{1}{4}$
111 1..3..4$\frac{1}{4}$
104
72
52
20

379..13..2
4
15|18..12..8
20
3|72
12
8|72
4
2|88

Or thus: multiply by the Number of Weeks, and divide the Product by 4 *and* 13 *being* 4×13=52 13) 15 .. 3 .. 8$\frac{1}{2}$

1 .. 3 .. 4$\frac{1}{4}$

N. B. *As it is* 4 *Weeks, I don't multiply, but only divide by* 13.

33. What is the Intereſt of £259 .13..5 for 20 Weeks. 5 *per Cent. per Annum?* *Anſ.* £4..19..10$\frac{1}{4}$

34. What is the Amount of £375 .6..1 for 12 Weeks, 4$\frac{1}{2}$ *per Cent. per Annum?* *Anſ.* £379..4 .0$\frac{1}{4}$.

35. What is the Amount of £256..5..3 for 25 Weeks, 2$\frac{3}{4}$ *per Cent. per Annum?* *Anſ.* £259..13..–.

When the Intereſt is for any Number of Days.

RULE. Multiply the *Pence* of the *Principal* by the *Days* d *Rate per Cent.* for a Dividend, cut off two Figures on Right-Hand, and divide by 365, the Quotient will be Anſwer in Pence. Or,

As 365 *Days*: are to the *Intereſt* of the given Sum for a ear, : : ſo are the *Days* given : to the *Intereſt* required.

36. What is the Intereſt of £240 for 120 Days, at 4 *Cent. per Annum?*

```
        240       240 |  As 365 : 9..12 :: 12
        240         4 |          20
       ----       --- |          --
      57600      9|60 |         192
        120        20 |         120
    -------      ---- |     -------- 2|0)
    6912000     12|00 |  365)23040(6|3
          4           |       2190    -----
   -------- 12)       |       ----    3..3..1¼
365)276480|00(757     |       1140
    2555      ---     |       1095
    ----  2|0)6|3..1  |       ----
    2098  ----------  |         45
    1825     3.3.1¼   |         12
    ----              |       ----
    2730              |      )540(1
    2555              |       365
    ----              |       ---
     175              |       175
       4              |         4
     ---              |       ---
    )700(1            |      )700(1
     365              |       365
     ---              |       ---
     335              |       335
```

37. What is the Intereſt of £397..5..4 for 3 Years a
75 Days, at £5 *per Cent. per Annum?* *Anſ.* £63..13..5

38. At £5 ½ *per Cent. per Annum*, what is the Intereſt
£985..2..7 for 5 Years 127 Days? *Anſ.* £289..15..3

39. What is the Intereſt of £2726..1..4 at 4 ½ *per Ce*
per Annum, for 3 Years 154 Days? *Anſ.* £419..15..6

When the Amount, Time and Rate per Cent. *are given,*
find the Principal.

RULE. As the *Amount* of £100 at the *Rate* and *Ti* given : is to £100 : : ſo is the *Amount* given : to the *Pri cipal* required.

40. Wh

40. What Principal being put to Intereſt will amount to £402..10..– in 5 Years Time at 3 *per Cent. per Annum?*

3×5+100=£115 : 100 : : 402..10

20 20

2300 8050
100

23|00)8050|00(£350 *Anſ.*

41. What Principal being put to Intereſt for 9 Years will amount to £734..8..– at 4 *per Cent. per Annum? Anſ.* £540.

42. What Principal being put to Intereſt for 7 Years at 5 *per Cent. per Annum,* will amount to £334..16..–? *Anſ.* £248.

When the Principal Rate per Cent. *and Amount are given to find the Time.*

Rule. As the *Intereſt* of the *Principal* for 1 Year : is to Year :: ſo is the whole *Intereſt* to the *Time* required.

43. In what time will £350 amount to £402..10..– at *per Cent. per Annum?*

350
3

10|50
20

10|00

As 10..10 : 1 :: 52..10 : 5
20 20

210 21|0)105|0(5 *Anſ.*
105

...

402..10
350..—

52..10

44. In what Time will £540 amount to £734..8..– at *per Cent. per Annum? Anſ.* 9 *Years.*

45. In what Time will £248 amount to £334..16..– at *per Cent. per Annum? Anſ.* 7 *Years.*

When the Principal Amount, and Time are given, to find the Rate per Cent.

Rule. As the *Principal* : is to the *Intereſt* for the whole *Time* :: ſo is £100 : to the *Intereſt* for the ſame Time. Divide that *Intereſt* by the *Time,* and the *Quotient* will be the Rate *per Cent.*

46. At what *Rate per Cent.* will £350 amount
£402..10..– in 5 Years Time?

```
350            As 350 : 52..10 :: 100 : £15.
———                         20
52..10..–                  ———
                           1050
                            100
                           ————
               35|0)10500|0(300s.=£15÷5=3 per Cent.
```

47. At what *Rate per Cent.* will £248 amount
£334..16..– in 7 Years Time? *Anſ.* 5 *per Cent.*

48. At what *Rate per Cent.* will £540 amount
£734..8..– in 9 Years Time? *Anſ.* 4 *per Cent.*

Compound INTEREST

Is that which ariſes both from the *Principal* and *Intere* that is, when the *Intereſt* on Money becomes due, and paid, the ſame *Intereſt* is allowed on that *Intereſt* unpai as was on the *Principal* before.

Rule 1. Find the firſt Year's *Intereſt*, which add to *Principal,* then find the *Intereſt* of that *Sum,* which add before, and ſo on for a Number of Years.

2. Subtract the given *Sum* from the laſt *Amount,* and will give the *Compound Intereſt* required.

Examples.

1. What is the Compound Intereſt of £500 foreborn Years, at 5 *per Cent. per Annum?*

```
500  500              525
  5   25               26. 5
———  ———             ————————
25|00 525 1ſt Year.   551..5 2d. Year.
        5                  5
      ———           ——————————   551.. 5
    26|25           27|56..5     27..11..3
       20               20       ——————————
      ———              ———       578..16.. 3 3d Year.
     5|00            11|25       500        Prin. ſub
                        12       ————————————
                       ———         78..16.. 3 = Int
                      3|00                for 3 Ye
```

2. What is the Amount of £400 forborne 3 ½ Years, 6 *per Cent. per Ann.* Compound Intereſt? *Anſ.* 490..13.

3.

3. What will £650 amount to in 5 Years, at 5 *per Cent. er Annum* Compound Intereſt? *Anſ.* £829..11..8.

4. What is the Amount of £550..10..– for 3 Years and 6 Months, at 6 *per Cent. per Annum,* Compound Intereſt? *Anſ.* £675..6..5.

5. What is the Compound Intereſt of £764 for 4 Years nd 9 Months, at £6 *per Cent. per Annum?* *Anſ.* £243..18..8 ½.

6. What is the Compound Intereſt of £57..10..6 for 5 ears, 7 Months, and 15 Days, at 5 *per Cent. per Annum?* *Anſ.* £18..3..8 ½.

7. What is the Compound Intereſt of £259..10..– for Years, 9 Months, and 10 Days, at 4 ½ *per Cent. per nnum?* *Anſ.* £46..19..10 ½.

REBATE, *or* DISCOUNT,

IS the abating ſo much Money on a *Debt,* to be received before it is due, as that Money, if put to *Intereſt,* ould gain in the ſame *Time,* and at the ſame *Rate.* As 100 preſent Money would diſcharge a Debt of £105 to be id a Year to come, *Rebate* being made at 5 *per Cent.*

RULE. As £100 with the *Intereſt* for the *Time* given: to that *Intereſt* : : ſo is the Sum given: to the *Rebate* equired.

Subtract the *Rebate* from the given Sum, and the Remainder will be the *preſent Worth.*

EXAMPLES.

1. What is the Diſcount and preſent Worth of £487..12 r 6 Months, at 6 *per Cent. per Annum?*

m. ½ 6 As 103 : 3 :: 487..12
20 20
3
100 2060 9752
3
103 £. s.
206|0)2925|6(14..4 *Rebate.*
487..12 206
14..4
865
ſ. 473..8..0 *preſent Worth.* 824
416=4*s.*

2. What

2. What is the preſent Payment of £357..10..– which was agreed to be paid 9 Months hence, at 5 *per Cent. pe Annum?* *Anſ.* £344..11..7.

3. What is the Diſcount of £275..10..– for 7 Months, at 5 *per Cent. per Annum?* *Anſ.* £7..16.1 ¾.

4. Bought Goods to the Value of £109..10..– to be paid at 9 Months, what preſent Money will diſcharge the ſame, if I am allowed 6 *per Cent. per Annum* Diſcount? *Anſ.* £104..15..8 ½.

5 What is the preſent Worth of £527..9..1 payable Months hence, at 4 ¼ *per Cent.?* *Anſ.* £514..13. 10 ¾.

6. What is the Diſcount of £85..10..– due *September* th 8th, this being *July* 4th, Rebate, at 5 *per Cent. per A num?* *Anſ.* 15*s.* 3*d.* ½.

7. Sold Goods for £875..5..6 to be paid 5 Mont hence, what is the preſent Worth at 4 ½ *per Cent.?* *Anſ.* 859..3..4.

8. What is the preſent Worth of £500 payable in Months, at 5 *per Cent. per Annum?* *Anſ.* £480,

9. How much ready Money can I receive for a Note £75 due 15 Months hence, at 5 *per Cent.?* *Anſ.* £70..11..9

10. What will be the preſent Worth of £150 payable 3 four Months; *i. e.* one third at 4 Months, one third 8 Months, and one third at 12 Months, at 5 *per C* Diſcount? *Anſ.* £145..3..9..¼.

11. Sold Goods to the Value of £575..10..– to be pa at two 3 Months, what muſt be diſcounted for preſent Pa ment, at 5 *per Cent.?* *Anſ.* £10..11..4 ¾.

12. What is the preſent Worth of £500 at 4 *per C* £100 being to be paid down, and the reſt at two Months? *Anſ.* £488..7..9.

EQUATION *of* PAYMENT

IS when ſeveral *Sums* are due at different *Times* to a *mean Time* for paying the whole *Debt*: to do wh this is the *common*

RULE. Multiply each *Term* by its *Time*, and divide *Sum* of the *Products* by the whole *Debt*, the Quotient is counted the mean *Time*.

Ex

EXAMPLES.

1. *A* owes *B* £200, whereof £40 is to be paid at 3 Months, £60 at 5 Months, and £100 at 10 Months, at what Time may the whole Debt be paid together, without Prejudice to either?

£. *m.*
40 × 3 = 120
60 × 5 = 300
100 × 10 = 1000

2|00) 14|20

7 *Months* $\frac{1}{10}$.

2. *B* owes *C* £800, whereof £200 is to be paid at 3 Months, £100 at 4 Months, £300 at 5 Months, and £200 at 6 Months; but they agreeing to make but one Payment of the Whole, I demand when that Time muſt be? *Anſ.* 4 *Months*, 18 *Days.*

3. I bought of *K* a Quantity of Goods to the Value of £360, which was to have been paid as follows: £120 at 2 Months, £200 at 4 Months, and the reſt at 5 Months; but we afterwards agreed to have it paid at one mean Time, that Time is demanded? *Anſ.* 3 *Months*, 13 *Days.*

4. A Merchant bought Goods to the Value of £500 to pay £100 at the End of 3 Months, £150 at the End of 6 Months, and £250 at the End of 12 Months; but afterwards they agreed to diſcharge the Debt at one Payment; at what Time was this Payment made? *Anſ.* 8 *Months*, 12 *Days.*

5. *H* is indebted to *L* a certain Sum, which is to be paid at 6 different Payments, that is, $\frac{1}{4}$ at 2 Months, $\frac{1}{8}$ at 3 Months, $\frac{1}{8}$ at 4 Months, $\frac{1}{4}$ at 5 Months, $\frac{1}{8}$ at 6 Months, and the reſt at 7 Months; but they agreed that the Whole ſhould be paid at one equated Time, what is that Time? *Anſ.* 4 *Months one Quarter.*

6. *A* is indebted to *B* £120, whereof $\frac{1}{2}$ is to be paid at 3 Months, $\frac{1}{4}$ at 6 Months, and the reſt at 9 Months, what is the equated Time of the whole Payments? *Anſ.* 5 *Months*, 7 *Days.*

BARTER

IS the exchanging one Commodity for another, and informs the *Traders* ſo to proportion their Goods, that neither may ſuſtain *Loſs*.

RULE. *Firſt* find the Value of that *Commodity*, whoſe *Quantity is given*; then find what Quantity of the other, at the *Rate* propoſed, you may have for the ſame Money.

2dly, When one has Goods at a certain Price *ready Money*, but in *Bartering* advances it to ſomething more; find what the other ought to *Rate* his *Goods* at, in Proportion to that Advance, and then proceed as before.

EXAMPLES.

1. What Quantity of Chocolate, at 4*s. per lb.* muſt be delivered in Barter for 2 *cwt.* of Tea, at 9*s. per lb.*

2 Cwt.
112

224
9

2)2016 *the Value of the Tea.*

504 *lb. of Chocolate.*

2. *A* and *B* barter: *A* hath 20 *cwt.* of Prunes, at 4*d. pe* *lb.* ready Money, but in Barter will have 5*d. per lb.* and *B* hath Hops worth 32*s. pe* *cwt.* ready Money, what ought *B* to rate his Hops at in Barter, and what Quantity muſt be given for the 2 *cwt.* of Prunes?

112 As 4 : 5 :: 32
20 5

s.
40 2240 4)160
12 5

cwt. qr. lb. 40 S
48|0)1120|0(23..1..9 $\frac{16}{48}$ *An*
96

160
144

16 = 1 *qr.* 1 *lb.* $\frac{16}{48}$

3. How much Tea at 9*s. per lb.* can I have in Barter for 4 *cwt.* 2 *qrs.* of Chocolate, at 4*s. per lb.* *Anſ.* 2 *cwt.*

4. Two Merchants barter; *A* hath 20 *cwt.* of Cheeſe, at 21*s.* 6*d. per cwt.* *B* hath eight Pieces of *Iriſh* Cloth, at £3..14..– *per* Piece, I deſire to know who muſt receive the Difference, and how much?

Anſ. B. muſt receive of A. £8..2..–.

5. *A* and *B* barter; *A* hath 3 $\frac{1}{2}$ *lb.* of Pepper, at 13*d.* $\frac{1}{2}$ *per lb.* *B* hath Ginger, at 15*d* $\frac{1}{4}$ *per lb.* how much Ginger muſt be delivered in Barter for the Pepper?

Anſ. 3 *lb.* 1 *oz.* $\frac{35}{61}$.

6. How many Dozen of Candles, at 5*s.* 2*d. per* Dozen, muſt be delivered in Barter for 3 *cwt.* 2 *qrs.* 16 *lb.* of Tallow, at 37*s.* 4*d. per Cwt.*? *Anſ.* 26 *Doz.* 3 *lb.*

7. *A* hath 608 Yards of Cloth, worth 14*s. per* Yard, for which *B* giveth him £125..12..– in ready Money, and 85 *cwt.* 2 *qrs.* 24 *lb.* Bees-Wax, the Queſtion is, what did *B* reckon his Bees-Wax at *per cwt.*? *Anſ.* £3..10..–.

8. *A* and *B* barter: *A* hath 320 Dozen of Candles, at 4*s.* 6*d. per* Dozen, for which *B* giveth him £30 in Money, and the reſt in Cotton, at 8*d. per lb.* I deſire to know how much Cotton *B* gave *A* beſides the Money?

Anſ. 11 *cwt.* 1 *qr.*

9. If *B* hath Cotton, at 1*s.* 2*d. per lb.* how much muſt he give *A* for 114 *lb.* of Tobacco, at 6*d. per lb.*?

Anſ. 48 *lb.* $\frac{12}{14}$.

10. *C* hath Nutmegs worth 7*s.* 6*d. per lb.* ready Money, but in barter will have 8*s. per lb.* and *D.* hath Leaf Tobacco worth 9*d. per lb.* ready Money, how much muſt *D* rate his Tobacco at *per lb.* that his Profit may be equivalent with *C*'s? *Anſ.* 9*d.* $\frac{1}{2}$ $\frac{36}{99}$.

PROFIT *and* LOSS

IS a Rule that diſcovers what is *got* or *loſt* in the buying or ſelling of *Goods*, and inſtructs us to riſe or fall the *Price*, ſo as to gain or loſe ſo much *per Cent.* or otherwiſe.

The Queſtions in this Rule are performed by the Rule of Three.

EXAMPLES.

1. If a Yard of Cloth is bought for 11*s.* and ſold for 12*s.* 6*d.* what is the Gain *per Cent ?*

```
As 11 : 1 .. 6 :: 100
        12       20
        —       ———
        18      2000
                  18
12 .. 6          ————
11 .. –     11)36000
———————        ————
 1 .. 6      12)3272
                ————
             2|0)27|2 .. 8
                 —————————
        Anſ. 13..12 .. 8 8/11.
```

2. If 60 Ells of Holland coſt £18, what muſt 1 Ell be ſold for to gain £8 *per Cent?*

```
As 100 : 18 :: 108
             108
            ————     12×5=60
  1|00)19|44
          20    12)19..8..9½
          —        ————————
        8|80     5)1..12..4¼
          12       ————————
          —           6..5¼
        9|60
           4
        2|40
              Anſ. 6s. 5d. ¼
```

3. If 1*lb.* of Tobacco coſt 16*d.* and is ſold for 20*d.* what is the Gain *per Cent ?* *Anſ.* £25.

4. If a Parcel of Cloth be ſold for £560 and at £12 *pe* *Cent.* Gain, what was the prime Coſt ? *Anſ.* £500.

5. If a Yard of Cloth is bought for 13*s.* 4*d.* and ſol again for 16*s.* what is the Gain *per Cent ?* *Anſ.* £20.

6. If 112*lb.* of Iron coſt 27*s.* 6*d.* what muſt 1 *cwt.* be ſold for, to Gain 15 *per Cent ?* *Anſ.* £1..11..7 $\frac{1}{2}$

7. If 375 Yards of broad Cloth be ſold for £490 and 2 *per Cent.* Profit, what did it coſt *per* Yard ? *Anſ.* £1..1..9 $\frac{1}{4}$

8. Sold 1 *cwt.* of Hops for £6..15..– at the Rate of £2 *per Cent* Profit, what would have been the Gain *per Cent* if I had ſold them for £8 *per cwt ?* *Anſ.* £48..2..11$\frac{1}{2}$

9. If 90 Ells of Cambric coſt £60, how muſt I ſell it *p* Yard to Gain £18 *per Cent ?* *Anſ.* 12*s.* 7*d.*

10. A Plumber ſold 10 Fother of Lead for £204..15. (the Fother being 19 *cwt.* $\frac{1}{2}$) and gained after the Rate o £12..10..– *per Cent.* what did it coſt him *per cwt ?*

Anſ. 18*s.* 8*d.*

11. Bought 436 Yards of Cloth, at the Rate of 8*s.* 6*d.* *p* Yard, and ſold it for 10*s.* 4*d.* *per* Yard, what was the Gai of the Whole ? *Anſ.* £39..19..4

12. Paid £69 for one Ton of Steel, which is retailed a 6*d.* *per lb.* what is the Profit or Loſs by the Sale of 1 Tons ? *Anſ.* £182 *Lo*

13. Bought 124 Yards of Linen for £32 how ſhould the ame be retailed *per* Yard to gain £15 *per Cent?*

Anſ. 5*s.* 11*d.* $\frac{28}{124}$.

14 Bought 249 Yards of Cloth at 3*s.* 4*d. per* Yard, retailed the ſame at 4*s.* 2*d. per* Yard, what is the Profit in he whole, and how much *per Cent?*

Anſ. £10..7..6 *Profit, and* £25 *per Cent.*

FELLOWSHIP

IS when two or more join their *Stocks* and Trade together, ſo to determine each Perſon's particular *Share* of the *ain* or *Loſs*, in Proportion to his *Principal* in the Joint *tock.*

By this Rule a Bankrupt's Eſtate may be divided amongſt is Creditors, as alſo Legacies may be adjuſted when there is a eficiency of Aſſets or Effects.

FELLOWSHIP *is either with or without* TIME.

FELLOWSHIP *without* TIME.

RULE. As the whole *Stock* : is to the whole *Gain* and *oſs* : : ſo is each Man's *Share* in *Stock* : to his *Share* of the *ain* or *Loſs.*

PROOF. Add all the Shares together, and the Sum will e equal to the given *Gain* or *Loſs*;—but the ſureſt Way is, s the whole *Gain* or *Loſs* : is to the whole *Stock* : : ſo is ach *Man's Share* of the *Gain* or *Loſs* : to his *Share* in *Stock.*

EXAMPLES.

1. Two Merchants trade together; *A* put into Stock 20 and *B* £40, they gained £50, what is each Perſon's are thereof?

20×40=60

s 60 : 50 : : 20 As 60 : 50 : : 40 33 .. 6 .. 8 B's *Share.*

20 40 16 .. 13 .. 4 A's.

6|0) 100|0(6|0) 200|0 50

£16..13..4 £33..6..8

2. Three Merchants trade together, *A*, *B*, and *C*; *A* put in £20, *B* £30, and *C* £40, they gained 180, what is each Man's Part of the Gain? *Anſ.* A £40, B £60, C £80.

3. *A*, *B*, and *C* enter into Partnerſhip; *A* puts in £364, *B* £482, and *C* £500, and they gained £867, what is each Man's Share in Proportion to his Stock?

Anſ. A £234..9..3$\frac{1}{4}$ *rem.* 70. B £310..9..5—*rem.* 248. C £322..1..3 $\frac{1}{2}$ *rem.* 1028.

4. Four Merchants, *B*, *C*, *D*, and *E* made a Stock; *B* puts in £227, *C* £349, *D* £115, and *E* £439, in trading they gained £428, I demand each Merchant's Share of the Gain? *Anſ.* B £85 .. 19 .. 6 $\frac{3}{4}$—690. C £132 .. 3 .. 9—120. D £43..11..1 $\frac{3}{4}$—250. E £166..5..6 $\frac{1}{4}$—70.

5. Three Perſons, *D*, *E* and *F*, join in Company; *D*'s Stock was £750, *E*'s £460, and *F*'s £500, and at the End of 12 Months they gained £684, what is each Man's particular Share of the Gain?

Anſ. D £300, E £184, and F £200.

6, A Merchant is indebted to *B* £275 .. 14 .. –, to C £304..7..–, to *D* £152, and to *E* £104..6..–, but upon his Deceaſe, his Eſtate is found to be worth but £675..15, how muſt it be divided amongſt his Creditors?

Anſ. B £222..15..2—6584. C's £245.. 18 .. 1 $\frac{1}{2}$—15750. D's £122..16..2 $\frac{3}{4}$—12227, and E's £84..5..5—15620.

7. Four perſons trading together in a Joint Stock, of which *A* has $\frac{1}{3}$, *B* $\frac{1}{4}$, *C* $\frac{1}{5}$, and *D* $\frac{1}{6}$, and at the End of 6 Months, they gain £100, what is each Perſon's Share of the ſaid Gain? *Anſ.* A £35..1..9—48. B £26..6..3 $\frac{3}{4}$—36. C £21..1 .– $\frac{1}{2}$—120, and D £17..10..10 $\frac{1}{2}$—24.

8. Two Perſons purchaſed an Eſtate of £1700 *per Annum* Freehold for £27200, when Money was at 6 *per Cent.* Intereſt, and 4*s. per* £. Land Tax, whereof *D* paid £15000 and *E* the reſt; ſome Time after the Intereſt of Money falling to 5 *per Cent.* and 2*s. per* £. Land Tax, they ſell the ſaid Eſtate for 24 Years Purchaſe, I deſire to know each Perſon's Share. *Anſ.* D £22500, E £18300.

9. *D*, *E*, and *F* join Stocks in Trade; the Amount of their Stocks is £647, and are in Proportion as 4, 6 and 8 is to one another, and the Amount of this Gain is equal to *D*'s Stock, what is each Man's Stock and Gain? *Anſwer*,

D'*s Stock*, £143 .. 15 .. 6$\frac{1}{2}$ $\frac{2}{3}$ *Gain*, £31 .. 19 .. – 184036.
E'*s* - - - - - - 215 .. 13 .. 4 47 .. 18 .. 6 414080.
F'*s* - - - - - - 287 .. 11 .. 1$\frac{1}{4}$ $\frac{1}{3}$ 63 .. 18 .. – 506098.

10. *D*,

I

10. *D*, *E*, and *F*, join Stocks in Trade; the Amount of eir Stocks was £100, *D*'s Gain £3, *E*'s £5, and *F*'s £8; at was each Man's Stock?

Anſ. D'*s* Stock £18 .. 15 .. –, E'*s* £31 .. 5, *and* F'*s* £50.

FELLOWSHIP *with* TIME.

Rule. As the *Sum* of the *Products* of each Man's *Money* d *Time* : is to the whole *Gain* or *Loſs* : : ſo is each Man's *roduct* : to his *Share* of the *Gain* or *Loſs*.

Proof. As in *Fellowſhip* without *Time*.

Examples.

1. *D* and *E* enter into Partnerſhip; *D* put in £40 for three onths, and *E* £75 for four Months, and they gained £70; hat is each Man's Share of the Gain? *Anſ.* D £20, E £50.

0×3=120 As 420 : 70 :: 120 As 420 : 70 : : 300

5×4=300 120 300

420 42|0)840|0 42|0)2100|0

20 50

2. Three Merchants join in Company, *D* puts in Stock 195..14..– for 3 Months, *E* £169..18..3 for 5 Months, d *F* £59 .. 14 .. 10 for 11 Months, and they gained 364..18..–; what is each Man's Part of the Gain?

nſ. D'*s* £102. 6..4—5008. E'*s* £148..1..1 ½—482802, *d* F'*s* £114..10..6 ¼—14707.

3. Three Merchants join in Company for 18 Months. *D* t in £500 and at 5 Months End took out £200, at 10 onths End put in £300, and at the End of 14 Months kes out £130. *E* puts in £400, and at the End of 3 onths £270 more; at 9 Months he takes out £140, but ts in £100 at the End of 12 Months, and withdraws £99 the End of 15 Months. *F* puts in £900, and at 6 Months ok out £200; at the End of 11 Months puts in £500, but kes out that and £100 more at the End of 13 Months. hey gained £200. I deſire to know each Man's Share of e Gain? *Anſ.* *D* £50..7..6—21720. *E* £62..12..5 ¼—859, *and F* £87 .. – .. – ¼—14167.

H

4. D.

4. *D*, *E* and *F* hold a Piece of Ground in Common, f which they are to pay £36..10..6, *D* puts in 23 Ox 27 Days, *E* 21 Oxen 35 Days, and *F* 16 Oxen 23 Da what is each Man to pay of the ſaid Rent? *Anſwer*, £13..3..1½ — 624. E £15..11..5 — 1688, *and* £7..15..11 — 1136.

ALLIGATION.

Alligation *is either* **Medial** *or* **Alternate.**

Alligation Medial

Is when the *Price* and *Quantities* of ſeveral *Simples* a given to be mixed, to find the *mean Price* of that Mixtu

Rule. As the whole *Compoſition* : is to its total *Valu* ſo is any Part of the *Compoſition* : to its *mean Price*.

Proof. Find the Value of the whole Mixture at the *me Rate*, and if it agrees with the *total Value* of the ſeve *Quantities* at their reſpective *Prices*, the Work is right.

Examples.

1. A Farmer mixed 20 Buſhels of Wheat, at 5*s.* Buſhel, and 36 Buſhels of Rye, at 3*s.* *per* Buſhel, with Buſhels of Barley, at 2*s.* *per* Buſhel. I deſire to know Worth of a Buſhel of this Mixture?

$20 \times 5 = 100$ As 96 : 288 :: 1 : 3
$36 \times 3 = 108$
$40 \times 2 = 80$
96 288 *Anſ.* 3*s.*

2. A Vinter mingles 15 Gallons of Canary, at 8*s.* Gallon, with 20 Gallons, at 7*s.* 4*d.* *per* Gallon; 10 Ga lons of Sherry, at 6*s.* 8*d.* *per* Gallon, and 24 Gallons White Wine, at 4*s.* *per* Gallon; what is the Worth of Gallon of this Mixture? *Anſ* 6*s.* 2*d.* $\frac{1}{2}$ $\frac{46}{69}$

3. A Grocer mingled 4 *cwt.* of Sugar, at 56*s.* *per* c 7 *cwt.* at 43*s.* *per cwt.* and 5 *cwt.* at 37*s.* *per cwt.* I d mand the Price of 2 *cwt.* of this Mixture? *Anſ.* £4..8..

4. A Malſter mingles 30 Quarters of brown Malt, at 3s. *per* Quarter, with 46 Quarters of pale, at 30s. a Quarter, and 24 Quarters of high dried *ditto*, at 25s. a Quarter; what is the Value of 8 Buſhels of this Mixture?

Anſ. £1..8..2 $\frac{1}{4}$ $\frac{6}{10}$.

5. If I mix 27 Buſhels of Wheat, at 5s. 6d. the Buſhel, with the ſame Quantity of Rye, at 4s. *per* Buſhel, and 14 Buſhels of Barley, at 2s. 8d. *per* Buſhel, what is the Worth of a Buſhel of this Mixture? *Anſ.* 4s. 3d. $\frac{3}{4}$ $\frac{28}{68}$.

6. A Grocer mingled 3 *cwt.* of Sugar, at 56s. *per cwt.* 6 *cwt.* at £1..17..4 *per cwt.* and 3 *cwt.* at £3..14..8 *per cwt.* what is 1 *cwt.* of this Mixture worth?

Anſ. £2..11..4.

7. A Mealman has Flour of ſeveral Sorts, and would mix Buſhels at 3s. 5d. *per* Buſhel, 4 Buſhels at 5s. 6d. *per* Buſhel, and 5 Buſhels at 4s. 8d. *per* Buſhel, what is the Worth of a Buſhel of this Mixture? *Anſ.* 4s. 7d. $\frac{1}{2}$ $\frac{4}{12}$.

8. A Vinter mixes 20 Gallons of Port, at 5s. 4d. *per* Gallon, with 12 Gallons of White Wine, at 5s. *per* Gallon; 0 Gallons of Liſbon, at 6s. *per* Gallon, and 20 Gallons of Mountain, at 4s. 6d. *per* Gallon; what is a Gallon of this Mixture worth? *Anſ.* 5s. 3d. $\frac{3}{4}$ $\frac{50}{82}$.

9. A Farmer mingled 20 Buſhels of Wheat, at 5s. *per* Buſhel, and 36 Buſhels of Rye, at 3s. *per* Buſhel, with 40 Buſhels of Barley, at 2s. *per* Buſhel, I deſire to know the Worth of a Buſhel of this Mixture? *Anſ.* 3s.

10. A Perſon mixing a Quantity of Oats, at 2s. 6d. *per* Buſhel, with the like Quantity of Beans, at 4s. 6d. *per* Buſhel, would be glad to know the Price of one Buſhel of that Mixture? *Anſ.* 3s. 6d.

11. A Refiner having 12 *lb.* of Silver Bullion, of 6 *oz.* fine, would melt it with 8 *lb.* of 7 *oz.* fine, and 10 *lb.* of 8 *oz.* fine, required the Fineneſs of 1 *lb.* of that Mixture?

Anſ. 6 *oz.* 18*d. wt.* 16 *gr.*

12. If with 40 Buſhels of Corn at 4s. *per* Buſhel, there are mixed 10 Buſhels at 6s. *per* Buſhel, 30 Buſhels at 5s. *per* Buſhel, and 20 Buſhels at 3s. *per* Buſhel, what will 10 Buſhels of that Mixture be worth? *Anſ.* £2..3..–.

13. A Tobacconiſt would mix 50 *lb.* of Tobacco, at 11*d.* *per lb.* with 30 *lb.* at 14*d.* *per lb.* 25 *lb.* at 22*d.* *per lb.* and 37 *lb.* at 2s. *per lb.* what will 1 *lb.* of this Mixture be worth?

Anſ. 16 *d.* $\frac{3}{4}$ $\frac{113}{142}$.

ALLIGATION ALTERNATE

IS when the *Price* of ſeveral Things are given, to fin ſuch *Quantities* of them to make a *Mixture*, that ma bear a *Price* propounded.

In ordering the Rates and given Prices, obſerve,

1. Place them one under the other, and the propounded *Price* or *mean Rate*, on the Left-hand of them, *thus*

18—
22 20—
24—
28—

Link the ſeveral *Rates* together by 2 and 2, always ob ſerving to join a *greater* and a *leſs* than the mean.

3. Againſt each *extream* place the *Difference* of the *me* and its *Yoke Fellow*.

When the Prices of the ſeveral Simples and the mean Rate a given without any Quantity, to find how much of each Sim is required to compoſe the Mixture.

RULE. Take the *Difference* between each *Price* and t *mean Rate*, and ſet them *alternately*, they will be the A ſwer required.

PROOF. By Alligation Medial.

EXAMPLES.

1. A Vinter would mix four Sorts of Wines together, 18*d*. 20*d*. 24*d*. and 28*d*. *per* Quart; what Quantity of ea muſt he take to ſell the Mixture at 22*d*. *per* Quart?

		Anſwer.	*Proof.*			*Or thus.*	
	18	2 of 18*d*. =	36*d*.		18	6 of 18*d*. =	10
22	20	6 of 20*d*. =	120	22	20	2 of 20*d*. =	4
	24	4 of 24*d* =	96		24	2 of 24*d*. =	4
	28	2 of 28*d*. =	56		28	4 of 28*d*. =	11
		14	)308			14	)30
			22*d*.				22*d*

N te, *Queſtions in this Rule admit of a great Vari Anſwers, according to the Manner of linking them.*

2.

2. A Grocer would mix Sugar, at 4*d.* 6*d.* and 10*d.* *per* . ſo as to ſell the Compound at 8*d.* *per lb.* what Quantity each muſt he take?

Anſ. 2 *lb.* *at* 4*d.* 2 *lb.* *at* 6*d.* *and* 6 *lb.* *at* 10*d.*

3. I deſire to know how much Tea, at 16*s.* 14*s.* 9*s.* and *s.* *per lb.* will compoſe a Mixture worth 10*s.* *per lb.*?

Anſ. 1 *lb.* *at* 16*s.* 2 *lb.* *at* 14*s.* 6 *lb.* *at* 9*s.* *and* 4 *lb.* *at* 8*s.*

4. A Farmer would mix as much Barley at 3*s.* 6*d.* *per* uſhel, Rye at 4*s.* *per* Buſhel, and Oats at 2*s.* *per* Buſhel, to make a Mixture worth 2*s.* 6*d.* *per* Buſhel; how much is at of each Sort? *Anſ.* 6 *of Barley*, 6 *of Rye*, *and* 30 *of Oats.*

5. A Grocer would mix Raiſins of the Sun at 7*d.* *per lb.* ith *Malaga's* at 6*d.* and *Smyrna's* at 4*d.* *per lb.* I deſire to now what Quantity of each Sort muſt he take to ſell them 5*d.* *per lb.*? *Anſ.* 1 *lb.* *of Raiſins of the Sun*, 1 *lb.* *of* *alaga's and* 3 *lb.* *of Smyrna's.*

6. A Tobacconiſt would mix Tobacco of 2*s.* 1*s.* 6*d.* and 3*d.* *per lb.* ſo as the Compound may bear a Price of 8*d.* *per lb.* what Quantity of each Sort muſt he take?

Anſ. 7 *lb.* *at* 2*s.* 4 *lb.* *at* 1*s.* 6*d.* *and* 4 *lb.* *at* 1*s.* 3*d.*

ALTERNATION PARTIAL

S when the *Prices* of all the *Simples*, the *Quantity* of but one of them, and the *mean Rate* are given, to find the everal *Quantities* of the Reſt in Proportion to that given.

RULE 1. Take the *Difference* between each *Price*, and e *mean Rate* as before. *Then*,

As the *Difference* of that *Simple*, whoſe *Quantity* is given : to the reſt of the *Differences ſeverally* :: ſo is the *Quantity* iven :: to the ſeveral *Quantities* required.

EXAMPLES.

1. A Tobacconiſt being determined to mix 20 *lb.* of Tobacco, as 15*d.* *per lb.* with others at 16*d.* *per lb.* 18*d.* *per lb.* nd 22*d.* *per lb.* how many Pounds of each Sort muſt he take make one Pound of that Mixture worth 17*d.*?

			Anſ.	*Proof.*
	15 ——	5	20 *lb.* at 15*d.* = 300*d.*	As 5 : 1 :: 20 : 4
	16 —	1	4 *lb.* at 16*d.* = 64	As 5 : 1 :: 20 : 4
17	18 —	1	4 *lb.* at 18*d.* = 72	As 5 : 2 :: 20 : 8
	22 ——	2	8 *lb.* at 22*d* = 176	

Anſ. 36 *lb.* : 612*d.* :: 1 *lb.* : 17*d.*

2. A Farmer would mix 20 Buſhels of Wheat, at 60*d.* the Buſhel, with Rye, at 36*d.* Barley, at 24*d.* and Oats at 18*d.* *per* Buſhel; how much muſt he take of each Sort to make the Compoſition worth 32*d.* *per* Buſhel? *Anſ.* 20 *Buſhels of Wheat,* 35 *Buſhels of Rye,* 70 *Buſhels of Barley, and* 10 *Buſhels of Oats.*

3. A Perſon is deſirous of mixing Wheat, at 4*s.* *per* Buſhel, Rye, at 3*s.* *per* Buſhel, Barley, at 2*s.* *per* Buſhel, with 12 Buſhels of Oats, at 18*d.* *per* Buſhel; I would be glad to know how many Buſhels of each Sort he muſt take to make the Compoſition worth 3*s.* 6*d.* *per* Buſhel? *Anſ.* 96 *Buſhels of Wheat,* 12 *Buſhels of Rye,* 12 *of Barley, and* 12 *of Oats.*

4. A Diſtiller would mix 40 Gallons of *French* Brandy, at 12*s.* *per* Gallon, with *Engliſh* at 7*s.* and Spirits, at 4*s.* *per* Gallon; what Quantity of each Sort muſt he take to afford it for 8*s.* *per* Gallon? *Anſ.* 40 *Gallons* French, 32 Engliſh, *and* 32 *Spirits.*

5. A Grocer would mix Teas of 12*s.* 10*s.* and 6*s.* with 20*lb.* at 4*s.* *per lb.* how much of each Sort muſt he take to make the Compoſition worth 8*s.* *per lb.*? *Anſ.* 20 *lb. at* 4*s.* 10 *lb. at* 6*s.* 10 *lb. at* 10*s.* *and* 20 *lb. at* 12*s.*

6. A Wine Merchant is deſirous of mixing 18 Gallons of Canary, at 6*s.* 9*d.* *per* Gallon, with *Malaga*, at 7*s.* 6*d.* *per* Gallon; Sherry, at 5*s.* *per* Gallon, and White Wine at 4*s.* 3*d.* *per* Gallon; how much of each Sort muſt he take, that the Mixture may be ſold for 6*s.* the Gallon? *Anſ.* 18 *Gallons of* Canary, 31½ *of* Malaga, 13½ *of Sherry, and* 27 *of White Wine.*

ALTERNATION TOTAL

IS when the *Price* of each *Simple*, the *Quantity* to be compounded, and the *mean Rate*, are given, to find how much of *each* Sort will make that *Quantity*.

RULE 1. Take the *Difference* between each *Price*, and the *mean Rate* as before; then

As the *Sum* of the *Difference* : is to each particular *Difference* :: ſo is the *Quantity* given : to the *Quantity* required.

EXAMPLES.

1. A Grocer has four ſorts of Sugar, *viz.* 12*d.* 10*d.* 6*d.* and 4*d. per lb.* and would make a Compoſition of 144*lb.* worth 8*d. per lb.* I deſire to know what Quantity of each he muſt take?

		Anſwer	*Proof.*	
	12	4 - - 48 at 12*d.*	576	As 12 : 4 : : 144 : 48
8	10	2 - - 24 at 10*d.*	240	As 12 : 2 : : 144 : 24
	6	2 - - 24 at 6*d.*	144	
	5	4 - - 48 at 4*d.*	192	
		12 144	)1152(8*d.*	

2. A Druggiſt having four Sorts of Tea, of 5*s.* 6*s.* 8*s.* and 9*s. per lb.* would have a Compoſition of 87 *lb.* worth 7*s. per lb.* what Quantity muſt there be of each? *Anſ.* 14 ½ *lb. of* 5*s.* 29 *lb. of* 6*s.* 29 *lb. of* 8*s. and* 14 ½ *lb. of* 9*s.*

3. A Vinter hath four Sorts of Wine, *viz.* White Wine, t 4*s. per* Gallon, *Flemiſh* at 6*s. per* Gallon, *Malaga* at 8*s.* *er* Gallon, and Canary at 10*s. per* Gallon, would make Mixture of 60 Gallons to be worth 5*s. per* Gallon; what Quantity of each muſt he take? *Anſ.* 45 *Gallons of White Wine,* 5 *Gallons of* Flemiſh, 5 *Gallons of* Malaga, *and* 5 *allons of* Canary.

4. A Grocer having four Sorts of Currants, of 11*d.* 9*d.* *d.* and 4*d.* the *lb.* is deſirous of making a Compoſition of 240 *lb.* worth 8*d.* the *lb.* how much of each muſt he take? *Anſ.* 96 *lb. at* 11*d.* 48 *lb. at* 9*d.* 24 *lb. at* 6*d. and* 72 *lb.* *t* 4*d.*

5. A Silverſmith hath 4 Sorts of Gold, *viz.* of 24 Carats ine, of 22, 20 and 15 Carats fine, would mix as much of ach ſort together, ſo as to have 42 *oz.* of 17 Carats fine, ow much muſt he take of each? *Anſ.* 4 *of* 24 *Carats fine,* *of* 22, 4 *of* 20, *and* 30 *of* 15 *Carats fine.*

6. A Druggiſt having ſome Drugs of 8*s.* 5*s.* and 4*s. per* . made them into two Parcels, one of 28 *lb.* at 6*s. per lb.* e other of 42 *lb.* at 7*s. per lb.* how much of every Sort d he take for each Parcel?

Anſ. 12 *lb. of* 8*s.*	*Anſ.* 30 *lb. of* 8*s.*
8 *lb. of* 5*s.*	6 *lb. of* 5*s.*
8 *lb. of* 4*s.*	6 *lb. of* 4*s.*
28 *lb. at* 6*s. per lb.*	42 *lb. at* 7*s. per lb.*

POSITION, or the RULE of FALSE

IS a Rule that, by *falſe* or *ſuppoſed* Numbers, taken at Pleaſure, we diſcover the *true* ones required.

POSITION is divided into two Parts, SINGLE and DOUBLE.

SINGLE POSITION

Is, by uſing *one ſuppoſed* Number, and working with it as the *true* one, you find the *real* Number required by the following

RULE. As the *Total* of the *Errors* : is to the *true Total* : : ſo is the *ſuppoſed Number* : to the *true one* required.

PROOF. Add the ſeveral Parts of the Sum together, and if it agrees with the Sum it is right.

EXAMPLES.

1. A School-maſter being aſked how many Scholars he had, ſaid, if I had as many, Half as many, and one Quarter as many more, I ſhould have 88; how many had he? *Anſ.* 32.

Suppoſe he had	40	As 110 : 88 : : 40	32
as many	40	40	32
Half as many	20	——	16
¼ *as many*	10	11|0)352|0(	8
	——	——	—
	110	32	88 *Proof*

2. A Perſon having about him a certain Number of *Portugal* Pieces, ſaid, if the third, fourth and ſixth of them were added together, they would make 54; I deſire to know how many he had? *Anſ.* 72.

3. A Gentleman bought a Chaiſe, Horſe and Harneſs for £60; the Horſe came to twice the Price of the Harneſs and the Chaiſe to twice the Price of the Horſe and Harneſs; what did he give for each? *Anſwer, Horſe* £13..6..8 *Harneſs* £6..13..4, *Chaiſe* £40.

4. *A*, *B*, and *C*, being determined to buy a Quantity o Goods, which would coſt them £120, agreed among themſelves that *B* ſhould have a third Part more than *A* and *C* a fourth Part more than *B*. I deſire to know wh each Man muſt pay? *Anſ. A* £30, *B* £40, *C*. £50.

5.

5. A Man, overtaking a Maid driving a Flock of Geeſe, ſaid to her, How do you do Sweetheart? Where are you going with theſe 30 Geeſe? No, Sir, ſaid ſhe, I have not 30, but if I had as many more, Half as many more, and 5 Geeſe beſides, I ſhould have 30; how many had ſhe? *Anſ.* 10.

6. A Perſon delivered to another a Sum of Money, unknown, to receive Intereſt for the ſame at 6 *per Cent. per Annum*, ſimple Intereſt, and at the End of ten Years received for Principal and Intereſt £300; what was the Sum lent?

Anſ. £187 .. 10 .. –.

DOUBLE POSITION

Is by making Uſe of *two ſuppoſed* Numbers, and if both prove *falſe* (as it generally happens) are with their *Errors* to be thus ordered.

RULE 1. Place each *Error* againſt its reſpective *Poſition.*

2. Multiply them croſs-wiſe.

3. If the *Errors* are *alike*, *i e.* both *greater*, or both *leſs* than the given Number, take their Difference for a *Diviſor*, and the *Differences* of their Products for a *Dividend.*

But if *unlike*, take their *Sum* for a *Diviſor*, and the *Sum* of their *Products* for a *Dividend*, the *Quotient* will be the *Anſwer.*

EXAMPLES.

1. *A*, *B* and *C* would divide £200 between them, ſo as that *B* may have £6 more than *A*, and *C* £8 more than *B*, how much muſt each have?

Suppoſe A *had* 40	*Then ſuppoſe* A *had* 50
then B *had* 46	*then* B *muſt have* 56
and C - - - 54	*and* C - - - - - - 64
140 *too little by* 60	170 *too little by* 30

Sup.		*Errors.*
40	╳	60
50		30
3000		1200
1200		

3\|0)180\|0

60 *Anſ. for* A.

60
30
30 *Diviſor.*

60 A
66 B
74 C
200 *Proof.*

2. A Man had two Silver Cups, of unequal Weight, having one Cover to both, of 5 oz. now if the Cover is put on the leſſer Cup, it will be double the Weight of the greater Cup; and ſet on the greater Cup, it will be thrice as heavy as the leſſer Cup; what is the Weight of each Cup?

Anſ. 3 *Ounces leſſer,* 4 *greater.*

3. *A*, *B* and *C* playing at Hazard together, the Money ſtaked was 196 Guineas; but diſagreeing, each ſeized a many as he could; *A* got a certain Quantity, *B* as many a *A* and 16 more, and *C* the 6th Part of both their Sums; how many had each? *Anſ.* A 76, B 92, *and* C 28.

4. A Gentleman bought a Houſe with a Garden, and a Horſe in the Stable, for £500; now he paid 4 Times th Price of the Horſe for the Garden, and five Times the Price of the Garden for the Houſe, what was the Value o the Houſe, Garden and Horſe ſeparately?

Anſ. Horſe £20, *Garden* £80, *Houſe* £400

5. Three Perſons diſcourſed concerning their Ages; ſay *H*, I am 30 Years of Age; ſays *K*, I am as old as *H*, an ¼ of *L*; and ſays *L*, I am as old as you both; what was th Age of each Perſon? *Anſ.* H 30, K 50, *and* L 80.

6. *D*, *E* and *F* playing at Cards, ſtaked 324 Crowns; but diſputing about the Tricks, each took as many as h could; *D* got a certain Number; *E* as many as *D*, and 1 more; and *F* got a 5th Part of both their Sums added to gether; how many did each get?

Anſ. D 127 ½ E 142 ½ *and* F 5

7. *A* ſtealing Apples, was taken by *B*, and to appea him gave him Half he had, and *B* gives him back 10; go ing farther, he meets *C*, who took from him Half of wha he had left, and gives him back 4. After that, meetin with *D*, he gives him Half of what he had, and he retur him back one; at laſt, getting ſafe away, he finds he ha 13 left, how many had he at firſt?

Anſ. 60.

8. A Gentleman coming into a Garden, meets with ſo Ladies, ſays to them, Good Morning to you 10 fair Maids Sir, you miſtake (anſwered one of them) we are not 1 but if we were twice as many more as we are, we ſhou be as many above 10 as we are now under; how many we they? *Anſ.* 5.

EXCHANG

EXCHANGE

IS the receiving of Money in one Country for the ſame Value paid in another.

The *Par* of Exchange is always fixed and certain, it being the intrinſic Value of Foreign Money compared with *Sterling*, but the *Courſe* of Exchange riſes and falls upon various Occaſions.

I. FRANCE.

They keep their *Accounts* at *Paris*, *Lyons* and *Rouen*, in *Livres*, *Sols* and *Deniers*, and Exchange by the *Crown*, =4*s.* 6*d.* at *Par*.

NOTE. 12 *Deniers make* 1 *Sol.*
20 *Sols* - - - - - 1 *Livre.*
3 *Livres* - - - - 1 *Crown.*

To change French *into* Sterling.

RULE. As 1 Crown : is to the given Rate : : ſo is the *French* Sum to the *Sterling* required.

To change Sterling *into* French.

RULE. As the Rate of Exchange : is to 1 Crown : : ſo is the *Sterling* Sum : to the *French* required.

EXAMPLES.

1. How many Crowns muſt be paid at *Paris*, to receive in *London* £180 Exchange at 4*s.* 6*d.* *per* Crown?

d. *cr.* £.
As 54 : 1 : : 180
240 *Crowns.*

54)43200(800
432

. . 00

2. A Merchant at *Paris* remits to his Correſpondent in *London* 800 Crowns, at 4*s.* 6*d.* each, what is the Value in *Sterling*?

cr. *d.* *cr.*
1 : 54 : : 800 :
54

12)43200

2|0)360|0

£180

3. How much Sterling muſt be paid in *London* to receive in *Paris* 758 Crowns Exchange, at 56*d.* *per* Crown?
Anſ. £176..17..4

4. A Merchant in *London* remits £176..17..4 to his Correſpondent at *Paris*, what is the Value in *French* Crowns, at 56*d.* *per* Crown? *Anſ.* 758. –

5. Change 725 Crowns, 17 Sols, 8 Deniers, at 54*d.* ½ *per* Crown, into Sterling, what is the Sum? *Anſ.* £164..14..–½

6. Change £164..14..–½ Sterling, into *French* Crowns; Exchange, at 54*d.* ½ *per* Crown?

Anſ. 725 *Crowns*, 17 *Sols*, 7 *Deniers*.

II. SPAIN.

They keep their Accounts at *Madrid*, *Cadiz*, and *Seville*, in *Dollars*, *Rials* and *Maravedies*, and Exchange by the *Piece of Eight* = 4*s.* 6*d.* at *Par*.

NOTE. 34 *Maravedies make* 1 *Rial.*
8 *Rials* - - - - - - 1 *Piaſtre, or Piece of Eight.*
10 *Rials* - - - - - - 1 *Dollar.*

RULE. As with *France*.

EXAMPLES.

7. A Merchant at *Cadiz* remits to *London* 2547 Pieces of Eight, at 56*d.* *per* Piece; how much Sterling is the Sum?

Anſ. £594 .. 6 .. –.

8. How many Pieces of Eight, at 56*d.* each, will anſwer a Bill of £594..6..– Sterling? *Anſ.* 2547.

9. If I pay a Bill here of £2500, what *Spaniſh* Money may I draw my Bill for at *Madrid*, Exchange at 57*d.* ½ *per* Piece of Eight? *Anſ.* 10434 *Pieces of Eight*, 6 *Rials*, 8 *Mar*

III. ITALY.

They keep their Accounts at *Genoa* and *Leghorn* i *Livres*, *Sols*, and *Deniers*, and Exchange by the *Piece of Eight*, or *Dollar* = 4*s.* 6*d.* at *Par*.

NOTE, 12 *Deniers make* 1 *Sol.*
20 *Sols* - - - - 1 *Livre.*
5 *Livres* - - - 1 *Piece of Eight at* Genoa.
6 *Livres* - - - 1 *Piece of Eight at* Leghorn

N. B. The Exchange at *Florence*, is by *Ducatoons*, th Exchange at *Venice* by *Ducats*.

NOTE. 6 *Solidi make* 1 *Groſs.*
24 *Groſſes* - - 1 *Ducat.*

RULE. The ſame as before.

Examples.

10. How much *Sterling* Money may a Perſon receive in *ndon,* if he pays in *Genoa* 976 Dollars, at 53*d. per* Dol- r? *Anſwer,* 215 *l.* 10 *s.* 8 *d.*

11. A Merchant remitted 21 *l.* 10 *s.* 8 *d. Sterling* to *Leg- rn,* how many Dollars will he receive there, the Ex- ange being at 53 *d. per* Dollar? *Anſwer,* 976.

12. A Factor hath ſold Goods at *Florence,* for 250 Duca- ons, at 54 *d.* each, what is the Value in Pounds *Sterling?* *Anſwer,* 56 *l.* 5 *s.*

13. A Bill of 56 *l.* 5 *s.* is remitted to *Florence,* to be paid Ducatoons, at 54 *d.* each, how many will be received? *Anſwer,* 250.

14. If 275 Ducats, at 4 *s.* 5 *d.* each, be remitted from *nice* to *London,* what is the Value in Pounds *Sterling?* *Anſwer,* 60 *l.* 14 *s.* 7 *d.*

15. A Gentleman travelling, would exchange 60 *l.* 14 *s.* *d. Sterling,* for *Venice* Ducats, at 4 *s.* 5 *d.* each, how many uſt he receive? *Anſwer,* 275.

IV. PORTUGAL.

They keep their Accounts in *Oporto* and *Liſbon,* in *Reas,* d Exchange on the *Milrea,* $=$ 6 *s.* 8 *d.* $\frac{1}{2}$ at *Par.*

Note, 1000 *Reas* make 1 *Milrea.*

Rule, the ſame with *France.*

Examples.

16. A Gentleman being deſirous to remit to his Corre- ondent in *London* 2750 Milreas, Exchange at 6 *s.* 5 *d. per* lrea, how much *Sterling* will he be Creditor for in *Lon-* ? *Anſwer,* 882 *l.* 5 *s.* 10 *d.*

17. If a Bill be drawn from *London* of 882 *l.* 5 *s.* 10 *d.* *rling,* how many Milreas, at 6 *s.* 5 *d.* each, is equal in lue to the ſaid Sum? *Anſwer,* 2750.

8. A Merchant at *Oporto* remits to *London* 4366 Milreas, d 183 Reas, at 5 *s.* 5 *d.* $\frac{5}{8}$ Exchange, *per* Milrea, how ch *Sterling* muſt be paid in *London* for this Remittance? *Anſwer,* 1193 *l.* 17 *s.* 6 *d.* $\frac{3}{4}$

9. If I pay a Bill at *London* of 1193 *l.* 17 *s.* 6 *d.* $\frac{3}{4}$, what ſt I draw for on my Correſpondent at *Liſbon,* Exchange *s.* 5 *d.* $\frac{5}{8}$ *per* Milrea? *Anſ.* 4366 *Milreas,* 183 *Reas.*

V. HOLLAND, FLANDERS, *and* GERMAN

They keep their Accounts at *Antwerp*, *Amſterdam*, *Br* *ſels*, *Rotterdam*, and *Hamburgh:* Some, in *Pounds*, *Shilling* and *Pence*, as in *England*; others, in *Guilders*, *Stivers*, a *Pennings*; and exchange with us on our *Pound* at 33 *s.* 4 *Flemiſh*, at *Par*.

Note. 8 *Pennings - make - -* 1 *Groat.*
2 *Groats or* 16 *Pennings* 1 *Stiver.*
20 *Stivers - - - - - - -* 1 *Guilder or Florin.*

ALSO,

12 *Groats or* 6 *Stivers make* 1 *Schelling.*
20 *Schelling or* 6 *Guilders -* 1 *Pound.*

To change Flemiſh *into* Sterling.

Rule. As the given Rate : is to 1 Pound : : ſo is t *Flemiſh* Sum : to the *Sterling* required.

To change Sterling *into* Flemiſh.

Rule. As £1 *Sterling* : is to the given Rate : : ſo is t *Sterling* given : to the *Flemiſh* ſought.

EXAMPLES.

20. Remitted from *London* to *Amſterdam*, a Bill £754..10..– *Sterling*, how many Pounds *Flemiſh* is the S the Exchange at 33*s.* 6*d.* *Flemiſh per* Pound Sterling?
Anſ. £1263..15..9 *Flemiſh.*

21. A Merchant at *Rotterdam* remits £1263..15..9 *Flem* to be paid in *London*, how much *Sterling* Money muſt he dr for, the Exchange being at 33*s.* 6*d.* *Flemiſh per* Pou *Sterling?* *Anſ.* £754..10..–.

22. If I pay in *London* £852..12..6 *Sterling*, how ma Guilders muſt I draw for at *Amſterdam*, Exchange at *Schel.* $4\frac{1}{2}$ *Groats Flemiſh per* Pound *Sterling?*
Anſ. 8792 *Guild.* 13 *Stiv.* $14\frac{1}{2}$ *Pennin*

22.. What muſt I draw for at *London*, if I pay at *Amſ* *dam* 8792 *Guild.* 13 *Stiv.* $14\frac{1}{2}$ *Pennings*, Exchange at *Schel.* $4\frac{1}{2}$ *Groats per* Pound *Sterling?*
Anſ. £852..12. 6.

o convert *Bank* Money into Current, and the contrary.

Note, *The* Bank *Money is worth more than the* Current. *be Difference between the one and the other is called* Agio, *d is generally from* 3 *to* 6 per Cent. *in Favour of the* Bank.

To change Bank *into* Current *Money.*

Rule. As 100 Guilders *Bank* : is to 100 with the *Agio* dded : : ſo is the *Bank* given : to the *Current* required.

To change Current *Money into* Bank.

Rule. As 100, with the *Agio* added : is to 100 *Bank* : : o is the *Current* Money given : to the *Bank* required.

24. Change 794 Guilders, 15 Stivers, Current Money, to Bank Florins, Agio $4\frac{3}{8}$ *per Cent.*
Anſ. 761 *Guilders,* 8 *Stivers,* 11 *Pennings.*
25. Change 761 Guilders, 9 Stivers Bank into Current oney, Agio $4\frac{3}{8}$ *per Cent.*
Anſ. 794 *Guilders,* 15 *Stivers,* 4 *Pennings.*

VI IRELAND.

26. A Gentleman remits to *Ireland* £575..15..– *Sterling,* hat will he receive there, the Exchange being at 10 *per* *nt.?* *Anſ.* £633..6..6.
27. What muſt be paid in *London* for a Remittance of 633..6..6 *Iriſh,* Exchange at 10 *per Cent.?*
Anſ. 575..15..–.

OMPARISON *of* WEIGHTS *aud* MEASURES.

Examples.

1. If 50 *Dutch* Pence be worth 65 *French* Pence, how many *utch* Pence are equal to 350 *French* Pence? *Anſ.* $269\frac{15}{65}$.
2. If 12 Yards at *London* make 8 *Ells* at *Paris,* how many ls at *Paris* will make 64 Yards at *London?* *Anſ.* $42\frac{8}{12}$.

3. If 30 *lb.* at *London* make 28 *lb.* at *Amſterdam*, ho many *lb.* at *London* will be equal to 350 *lb.* at *Amſterdam*

Anſ. 375.

4. If 95 *lb. Flemiſh* make 100 *lb. Engliſh*, how many *Engliſh* are equal to 275 *lb. Flemiſh?*

Anſ. $289\frac{45}{95}$.

CONJOINED PROPORTIO

IS when the *Coin*, *Weight*, or *Meaſures* of ſeveral Cou tries are compared in the ſame Queſtion; or it is linking together a Variety of Proportions.

When it is required to find how many of the firſt Sort o *Coin*, *Weight*, or *Meaſure* mentioned in the Queſtion, a equal to a given *Quantity* of the *laſt*,

RULE, Place the Numbers alternately, beginning at th Left-hand, and let the laſt Number ſtand on the Left-hand then multiply the firſt Row continually *for a Dividend*, an the ſecond for a *Diviſor*.

PROOF. By as many ſingle Rules of Three as the Queſti requires.

EXAMPLES.

1. If 20 *lb.* at *London* make 23 *lb.* at *Antwerp*, and 155 at *Antwerp*, make 180 *lb.* at *Leghorn*, how many *lb.* at *Lo don* are equal to 72 *lb.* at *Leghorn?*

Left.	*Right.*
20	23
155	180
72	

$20\times155\times72=223200$

$23\times180=4140)223200(53\frac{37}{41}$

2. If 12 *lb.* at *London* make 10 *lb.* at *Amſterdam*, 100 *lb.* *Amſterdam*, 120 *lb.* at *Thoulouſe*, how many Pounds at *Londo* are equal to 40 *lb.* at *Thoulouſe?* *Anſ.* 40 *lb.*

3. If 140 Braces at *Venice* are equal to 156 Braces *Leghorn*, and 7 Braces at *Leghorn* equal to 4 Ells *Engliſ* how many Braces at *Venice* are equal to 16 Ells *Engliſh?*

Anſ. $25\frac{80}{624}$.

4. If 40 *lb.* at *London* make 36 *lb.* at *Amſterdam*, and 90 at *Amſterdam* make 116 *lb.* at *Dantzick*, how many *lb.* at *Lond* are equal to 130 *lb.* at *Dantzick?* *Anſ.* $112\frac{288}{417}$

Whe

When it is required to find how many of the *laſt* Sort of
in, *Weight*, or *Meaſure* mentioned in the Queſtion, is
ual to a *Quantity* of the *firſt*,

RULE, Place the Numbers alternately, beginning at the
ft-hand, and let the laſt Number ſtand on the Right-
nd; then multiply the firſt Row for a *Diviſor*, and the
cond for a *Dividend*.

EXAMPLES.

5. If 12 *lb.* at *London* make 10 *lb.* at *Amſterdam*, 100 *lb.*
Amſterdam 120 at *Thoulouſe*, how many *lb.* at *Thoulouſe*
equal to 40 *lb.* at *London*?

Anſ. 40 *lb.*

6. If 40 *lb.* at *London* make 36 *lb.* at *Amſterdam*, and 90 *lb.*
Amſterdam, 116 at *Dantzick*, how many *lb.* at *Dantzick*
equal to 122 at *London*?

Anſ. 141 $\frac{1872}{3600}$.

PROGRESSION,

Conſiſts in TWO PARTS:

RITHMETICAL *and* GEOMETRICAL;

ARITHMETICAL PROGRESSION

S when a Rank of Numbers increaſe or decreaſe regularly by the continual *adding* or *ſubtracting* of the equal
mbers: As 1, 2, 3, 4, 5, 6, are in Arithmetical Pro-
ſſion by the continual *increaſing* or *adding* of one, 11, 9,
5, 3, 1, by the continual *increaſing* or *ſubtracting* of
o.

NOTE. *When any even Number of Terms differ by Arith-*
ical Progreſſion, the Sum of the two Extreams *will be equal*
the two middle *Numbers, or any two* Means *equally diſ-*
t from the Extreams: *As* 2, 4, 6, 8, 10, 12, *where* 6+8,
two middle Numbers, are =124+2, *the two Extreams,*
=10+4 *the two Means* =14.

When the Number of Terms are odd, the Double of the
ddle Term *will be equal to the* two Extreams, *or of any*
Means *equally diſtant from the* Middle Term: *As* 1, 2,
4, 5, *where the Double of* 3=5+1=2+4=6.

In *Arithmetical Progreſſion* five Things are to be obſerved, *vi*

1. The firſt Term.
2. The laſt Term.
3. The Number of Terms.
4. The equal Difference.
5. The Sum of all the Terms.

Any three of which being given, the other two may be foun

The *firſt*, *ſecond* and *third* Term given to find the *fifth.*

RULE. Multiply the *Sum* of the *two Extreams* by Half th *Number* of Terms, or multiply *Half* the Sum of the *tw* *Extreams* by the *whole Number* of Terms, the Product is th *Total* of all the Terms.

EXAMPLES.

1. How many Strokes does the Hammer of a Cloc ſtrike in 12 Hours? *Anſ.* 78.

$12+1=13$ *then* $13\times6=78$.

2. A Man buys 17 Yards of Cloth, and gave for t firſt Yard 2*s.* and for the laſt 10*s.* what did the 17 Yar amount to? *Anſ.* £5..2..

3. If 100 Eggs were placed in a right Line, exactly Yard aſunder from one another, and the firſt a Yard from Baſket, what Length of Ground does that Man go who g thers up theſe 100 Eggs ſingly, retnrning with every Eg to the Baſket to put it in? *Anſ.* 5 *Miles*, 1300 *Yar*

The *firſt*, *ſecond* and *third Terms* given, to find the *fourt*

RULE. From the *ſecond* ſubtract the *firſt*, the Remaind *divided* by the *third* leſs *one* gives the *fourth*.

EXAMPLES.

4. A Man had 8 Sons, the youngeſt was 4 Years o and the eldeſt 32, they increaſe in Arithmetical Progreſſio what was the common Difference of their Ages? *Anſ.*

$32-4=28$ *then* $28\div8-1=4$ *common Difference.*

5

5. A Man is to travel from *London* to a certain Place in 12 Days, and to go but 3 Miles the firſt Day, increaſing every Day by an equal Exceſs, ſo that the laſt Day's Journey may be 58 Miles, what is the daily Increaſe, and how many Miles diſtant is that Place from *London?*

Anſ. 5 *daily Increaſe.*

Therefore as 3 *Miles is the firſt Day's Journey.*
$3+5=8$ *the ſecond Day.*
$8+5=13$ *the third Day, &c.*
The whole Diſtance is 366 *Miles.*

The *firſt*, *ſecond* and *fourth* Terms given to find the *third.*

RULE. From the *ſecond* ſubtract the firſt, the Remainder *divide* by the *fourth*, and to the Quotient add 1, gives the *third.*

EXAMPLES.

6. A Perſon travelling into the Country, went 3 Miles the firſt Day, and increaſed every Day by 5 Miles, till at laſt he went 58 Miles in one Day, how many Days did he travel? *Anſ.* 12.

$58-3=55$ *then* $55\div5=11$ *and* $11+1=12$ *the Number of Days.*

7. A Man being aſked how many Sons he had, ſaid, that the Youngeſt was 4 Years old, and the Eldeſt 32, and that he increaſed one in his Family every four Years; how many had he? *Anſ.* 8.

The *ſecond*, *third* and *fourth* given to find the *firſt.*

RULE. Multiply the *fourth* by the *third* made *leſs* by 1; the Product ſubtracted from the *ſecond* gives the *firſt.*

EXAMPLES.

8. A Man in 10 Days went from *London* to a certain Town in the Country, every Day's Journey increaſing the former by 4, and the laſt he went 46 Miles, what was the firſt? *Anſ.* 10 *Miles.*

$4+10-1=36$ *then* $46-36=10$, *the firſt Day's Journey.*

9. A Man takes out of his Pocket at 8 ſeveral Times, ſo many different Numbers of Shillings, every one exceeding the former by 6; the laſt 46, what was the firſt? *Anſ.* 4.

The

The *ſecond*, *third* and *fifth* given, to find the *firſt*.

RULE. *Divide* the *fifth* by the *third*, and from the Quotient *ſubtract half* the Product of the *fourth* multiplied by the *third leſs* 1, gives the *firſt*.

EXAMPLES.

10. A Man is to receive £360 at 12 ſeveral Payments, each to exceed the former by £4, and is willing to beſtow the firſt Payment on any one that can tell him what it is; what will that Perſon have for his Pains? *Anſ.* £8.

$$360\div 12=30 \textit{ then } 30-\frac{4\times\overline{12-1}}{2}=8 \textit{ the firſt Payment.}$$

The *firſt*, *third* and *fourth* given to find the *ſecond*.

RULE. Subtract the *fourth* from the Product of the *third*, multiplied by the *fourth*, that Remainder added to the *firſt*, gives the *ſecond*.

EXAMPLE.

11. What is the laſt Number of an Arithmetical Progreſſion, beginning at 6, and continuing by the Increaſe of 8 to 20 Places? *Anſ.* 158.

$$\overline{20\times 8}-8=152 \textit{ then } 152+6=158, \textit{ the laſt Number.}$$

GEOMETRICAL PROGRESSION

IS the Increaſing or decreaſing of any Rank of Numbers by ſome common *Ratio*; that is, by the continual *Multiplication*, or *Diviſion* of ſome equal Number: *As* 2, 4, 8, 16 *increaſe* by the Multiplier, 2, and 16, 8; 4, 2, *decreaſe* by the Diviſor 2.

NOTE. *When any Number of Terms is continued in Geometrical Progreſſion, the Product of the two* Extreams *will be equal to any* two Means, *equally diſtant from the* Extreams: As 2, 4, 8, 16, 32, 64, where 64×2 *are* $=4\times 32$, *and* $8\times 16=128$.

When

When the Number of Terms are odd, *the* middle Term *multiplied into itſelf will be equal to the* two Extreams, *or ny* two, Means, *equally diſtant from the* Mean: As 2, 4, 8, 16, 32, *where* $2\times32=4\times16=8\times8=64$.

In *Geometrical Progreſſion* the ſame five Things are to be obſerved, as in *Arithmetical, viz.*

1. The firſt Term.
2. The laſt Term.
3. The Number of Terms.
4. The equal Difference or Ratio.
5. The Sum of all the Terms.

NOTE. *As the laſt Term in a long Series of Numbers is very tedious to come at, by continual Multiplication; therefore, for the readier finding it out, there is a Series of Numbers made uſe of in* Arithmetical Progreſſion, *called* Indices, *beginning with an* Unit, *whoſe common* Difference *is* one; *whatever Number of* Indices *you make uſe of, ſet as many Numbers (in ſuch* Geometrical Proportion *as is given in the Queſtion) under them:*

As 1, 2, 3, 4, 5, 6. *Indices.*
2, 4, 8, 16, 32, 64. *Numbers in Geometrical Proportion.*

But if the firſt Term in Geometrical Proportion *be* different *from the* Ratio, *the* Indices *muſt begin with a* Cypher.

As 0, 1, 2, 3, 4, 5, 6. *Indices.*
1, 2, 4, 8, 16, 32, 64. *Numbers in Geometrical Proportion.*

When the Indices *begin with a* Cypher, *the Sum of the* Indices *made choice of muſt be always one* leſs *than the Number of Terms given in the Queſtion; for* 1 *in the* Indices *is over the ſecond Term, and two over the third,* &c.

And any two of the Indices *together, and that* Sum, *will agree with the Product of their reſpective Terms,*

As in the firſt Table of Indices $2+5=7$
Geometrical Proportion $4\times32=128$

Then in the ſecond $2+4=6$
$4\times16=64$

In

In any *Geometrical Progreſſion* proceeding from *Unity*, the *Ratio* being known, to find any remote Term, without producing all the *intermediate Terms.*

RULE. Find what Figures of the *Indices* added together would give the *Exponent* of the *Term wanted*; then multiply the Members ſtanding under ſuch *Exponent* into each other, and it will give the *Term required.*

NOTE. *When the* Exponent 1 *ſtands over the* ſecond Term, *the Number of* Exponents *muſt be* 1 leſs *than the Number of* Terms.

EXAMPLES

1. A Man agrees for 12 Peaches, to pay only the Price of the laſt, reckoning a Farthing for the firſt, an Halfpenny for the ſecond, &c. doubling the Price to the laſt, what muſt he give for them? *Anſ.* £2..2..8.

16=4

0, 1, 2, 3, 4, *Exponents* 16=4

256=8

8=3

For 4+4+3=11, *N° of Terms leſs* 1.

4)2048=11 *N° of Far*

12)512

2|0)4|2..8

£2..2..8

2. A Country Gentleman going to a Fair to buy ſome Oxen, meets with a Perſon who had 23; he demanding the Price of them, was anſwered £16 a Piece: the Gentleman bids him £15 a Piece, and he would buy all: the other tells him it could not be taken; but if he would give what the laſt Ox would come to, at a Farthing for the firſt, and doubling it to the laſt, he ſhould have all. What was the Price of the Oxen? *Anſ.* £4369..1..4.

In any *Geometrical Progreſſion*, not proceeded from *Unity*, the *Ratio* being given, to find any remote *Term*, without producing all the *intermediate Terms.*

RULE. Proceed as in the *laſt*, only obſerve that every *Product* muſt be divided by the *firſt Term.*

EXAMPLES

EXAMPLES.

3. A Sum of Money is to be divided among 8 Perſons, the firſt to have £20, the ſecond £60, and ſo on in triple Proportion, what will the laſt have? *Anſ.* £43740.

$$\begin{matrix}0, & 1, & 2, & 3,\\ 20, & 60, & 180, & 540,\end{matrix} \quad \frac{540\times540}{20}=14580 \text{ then } \frac{14580\times60}{20}=43740$$

$3+3+1=7$ *one leſs than the Number of Terms.*

4. A Gentleman dying left 9 Sons, to whom and to his Executors, bequeathed his Eſtate in Manner following: To his Executors £50; his youngeſt Son was to have as much more as the Executors; and each Son to exceed the next younger by as much more; what was the eldeſt Son's Portion? *Anſ.* £25600.

The *firſt Term*, *Ratio*, and *Number* of *Terms* given to find the *Sum* of all the *Terms*.

RULE. Find the *laſt Term* as before, then ſubtract the *firſt* from it, and *divide* the Remainder by the *Ratio*, leſs, *one*, to the *Quotient* of which add the *greater*, gives the *Sum* required.

EXAMPLES.

5. A Servant ſkilled in Numbers, agreed with a Gentleman to ſerve him twelve Months, provided he would give him a Farthing for his firſt Month's Service, a Penny for the Second, and 4*d.* for the Third, &*c.* what did his Wages amount to? *Anſ.* £5825..8..5 ¼.

$$\begin{matrix}0, & 1, & 2, & 3, & 4,\\ 1, & 4, & 16, & 64, & 256,\end{matrix} \quad 256\times256=65536 \text{ then } 65536\times64=4194304$$

$$\frac{4194304-1}{4-1}=1398101. \text{ then}$$

$4+4+3=11$ N° *of Terms leſs* 1.

$$1398101+4194304=5592405 \text{ Farthings.}$$

6. A Man bought a Horſe, and by Agreement was to give a Farthing for the firſt Nail, three for the ſecond, &*c.* There were 4 Shoes, and in each Shoe 8 Nails, what was the Worth of the Horſe? *Anſ.* £965114681693..13..4.

7. A certain Perſon married his Daughter on New-year's Day, and gave her Huſband 1*s.* towards her Portion, promiſing to double it, on the firſt Day of every Month for one Year, what was her Portion? *Anſ.* £204..15..—.

8. A Laceman well verſed in Numbers agreed with a Gentleman to ſell him 22 Yards of rich Gold brocaded Lace, for 2 Pins the firſt Yard, 6 Pins the Second, &c. in triple Proportion. I deſire to know what he ſold the Lace for, if the Pins were valued at 100 for a Farthing; alſo what the Laceman got or loſt by the Sale thereof, ſuppoſing the Lace ſtood him in £7 *per* Yard?

Anſ. the Lace ſold for £326886..0..9.
Gain £326732..–..9.

PERMUTATION

IS the changing or varying the order of Things.

RULE. Multiply all the given Terms, one into another, and the laſt Product will be the Number of Changes required.

EXAMPLES.

1. How many Changes may be rung upon 12 Bells, and how long would they be ringing but once over, ſuppoſing 10 Changes might be rung in one Minute, and the Year to contain 365 Days, 6 Hours?

Anſ. 1×2×3×4×5×6×7×8×9×10×11×12= 479001600 *Changes which* ÷ 10 = 47900160 *Minutes, and if reduced, is* = 91 *Years,* 3 *Weeks,* 5 *Days,* 6 *Hours.*

2. A young Scholar coming into Town for the Conveniency of a good Library, demands of a Gentleman with whom he lodged, what his Diet would coſt for a Year; who told him £10; but the Scholar not being certain what Time he ſhould ſtay, aſked him what he muſt give him for ſo long as he could place his Family (conſiſting of ſix Perſons beſides himſelf) in different Poſitions, every Day at Dinner; the Gentleman thinking it would not be long, tells him £5, to which the Scholar agrees. What Time did the Scholar ſtay with the Gentleman? *Anſ.* 5040 *Days.*

THE

UTOR's ASSISTANT.

* * *

PART II.

* * *

VULGAR FRACTIONS.

A Fraction is a Part or Parts of an *Unit*, and written with two Figures, with a Line between them, as $\frac{1}{4}$, $\frac{3}{8}$, *&c.*

The Figure above the Line is called the *Nnmerator*, and e under one the *Denominator*, which ſhews how many rts the Unit is divided into, and the *Numerator* ſhews w many of thoſe Parts are meant by the Fraction.

There are four Sorts of Vulgar Fractions, *Proper*, *Im-per*, *Compound* and *Mixed*, viz.

1. A Proper Fraction is when the Numerator is *leſs* an the Denominator, as $\frac{2}{4}$, $\frac{3}{6}$, $\frac{7}{8}$, $\frac{9}{11}$, $\frac{101}{701}$, *&c.*

2. An Improper Fraction is when the Numerator is *ual* to, or *greater* than the Denominator, as $\frac{8}{3}$, $\frac{8}{4}$, $\frac{12}{12}$, 7, *&c.*

3. A Compound Fraction is the Fraction of a Fracn, and known by the Word *of*, as $\frac{1}{2}$ *of* $\frac{2}{3}$, $\frac{7}{9}$ *of* $\frac{8}{17}$ *of*, *&c.*

4. A Mixed Number *or* Fraction is compoſed of a hole Number and Fraction, as, 8 $\frac{2}{7}$, 17 $\frac{1}{2}$, 8 $\frac{71}{97}$, *&c.*

REDUCTION *of* VULGAR FRACTION

1. *TO reduce Fractions to a common Denominator.*

RULE. Multiply each Numerator into all the D nominators, except its own, for a new Numerator, and a the Denominators for a common Denominator. Or,

2. Multiply the common Denominator by the ſever given Numerators ſeparately, and divide the Product b their ſeveral Denominators, the Quotients will be the ne Numerators.

EXAMPLES.

1. Reduce $\frac{2}{4}$ and $\frac{4}{7}$ to a common Denominator.
Facit $\frac{14}{28}$, *and* $\frac{16}{28}$.

1*ſt. num.* 2*d. num.*
2×7=14 4×4=16 *then* 4×7=28 *den.* $=\frac{14}{28}$ *and*

2. Reduce, $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{5}{8}$ to a common Denominator.
Facit $\frac{32}{64}$, $\frac{48}{64}$, $\frac{40}{64}$.

3. Reduce, $\frac{7}{8}$, $\frac{4}{6}$, $\frac{9}{10}$, and $\frac{6}{7}$ to a common Denominato
Facit $\frac{2940}{3360}$, $\frac{2240}{3360}$, $\frac{3024}{3360}$, $\frac{2880}{3360}$.

4. Reduce, $\frac{6}{10}$, $\frac{2}{4}$, $\frac{1}{7}$ and $\frac{3}{6}$ to a common Denominato
Facit $\frac{1008}{1680}$, $\frac{840}{1680}$, $\frac{240}{1680}$, $\frac{840}{1680}$.

5. Reduce, $\frac{4}{5}$, $\frac{2}{3}$, $\frac{3}{7}$, and $\frac{1}{8}$ to a common Denominato
Facit $\frac{672}{840}$, $\frac{560}{840}$, $\frac{360}{840}$, $\frac{105}{840}$.

6. Reduce, $\frac{2}{6}$, $\frac{5}{9}$, $\frac{2}{8}$, and $\frac{3}{5}$ to a common Denominato
Facit $\frac{720}{2160}$, $\frac{1200}{2160}$, $\frac{540}{2160}$, $\frac{1296}{2160}$.

2. *To reduce a Vulgar Fraction to its* loweſt Terms.

RULE. Find a common Meaſure by dividing the low Term by the upper, and that Diviſor by the Remainde following, till nothing remain; the laſt Diviſor is the com mon Meaſure; then divide both Parts of the Fraction b the common Meaſure, and the Quotients will give t Fraction required.

Note. *If the common Meaſure happen to be* 1, *the Fraction already in its loweſt Term; and when a Fraction hath C phers at the Right Hand, it may be abbreviated by cutti them off; as* $\frac{4|0}{6|0}$.

EXAMPLES.

7. Reduce $\frac{24}{32}$ to its loweſt Terms.

24)32(1
—
then 8)$\frac{24}{32}$(=$\frac{3}{4}$. *Facit.*

com. Meaſure. 8)24(3
—

8. Reduce $\frac{30}{125}$ to its loweſt Terms. *Facit* $\frac{6}{25}$.
9. Reduce $\frac{208}{684}$ to its loweſt Terms. *Facit* $\frac{52}{171}$.
0. Reduce $\frac{192}{576}$ to its loweſt Terms. *Facit* $\frac{1}{3}$.
1. Reduce $\frac{825}{960}$ to its loweſt Terms. *Facit* $\frac{55}{64}$.
2. Reduce $\frac{5184}{6912}$ to its loweſt Terms. *Facit* $\frac{3}{4}$.

3. *To reduce a Mixed Number to an improper Fraction.*

Rule. Multiply the whole Number by the Denominator the Fraction, and to the Product add the Numerator for new Numerator, which place over the Denominator.

Note, *To expreſs a whole Number Fraction-ways, ſet* 1 *r the Denominator given.*

EXAMPLES.

3. Reduce 18 $\frac{3}{7}$ to an improper Fraction. *Facit* $\frac{129}{7}$.

$18\times7+3=129$ *new Numerator*, $\frac{129}{7}$.

Reduce 56 $\frac{13}{22}$ to an improper Fraction. *Facit* $\frac{1245}{22}$.
Reduce 183 $\frac{5}{21}$ to an improper Fraction. *Facit* $\frac{3848}{21}$.
Reduce 13 $\frac{4}{5}$ to an improper Fraction. *Facit* $\frac{69}{5}$.
Reduce 27 $\frac{2}{9}$ to an improper Fraction. *Facit* $\frac{245}{9}$.
Reduce 514 $\frac{5}{16}$ to an improper Fraction. *Facit* $\frac{8229}{16}$.

4. *To Reduce an improper Fraction to its proper Terms.*

Rule. Divide the upper Term by the lower.

EXAMPLES.

Reduce $\frac{129}{7}$ to its proper Terms. *Facit* 18 $\frac{3}{7}$.

$129\div7=18\frac{3}{7}$.

Reduce $\frac{1245}{22}$ to its proper Terms. *Facit* 56 $\frac{13}{22}$.
Reduce $\frac{3848}{21}$ to its proper Terms. *Facit* 183 $\frac{5}{21}$.
Reduce $\frac{69}{5}$ to its proper Terms. *Facit* 13 $\frac{4}{5}$.
Reduce $\frac{245}{9}$ to its proper Terms. *Facit* 27 $\frac{2}{9}$.
Reduce $\frac{8229}{16}$ to its proper Terms. *Facit* 514 $\frac{5}{16}$.

5. *To reduce a compound Fraction to a ſingle one.*

Rule. Multiply all the Numerators for a new Nume-tor, and all the Denominators for a new Denominator. Reduce the new Fraction to its loweſt Terms by Rule 2.

EXAMPLES.

25. Reduce $\frac{2}{3}$ of $\frac{3}{5}$ of $\frac{5}{8}$ to a ſingle Fraction.
Facit $\frac{2\times3\times5=30}{3\times5\times8=120}$ *reduced to the loweſt Term* $=\frac{1}{4}$

26. Reduce $\frac{5}{9}$ of $\frac{4}{7}$ of $\frac{11}{12}$ to a ſingle Fraction.
Facit $\frac{220}{756}=\frac{55}{189}$.

27. Reduce $\frac{11}{12}$ of $\frac{13}{14}$ of $\frac{21}{29}$ to a ſingle Fraction.
Facit $\frac{3003}{4872}=\frac{14}{23}$

28. Reduce $\frac{3}{4}$ of $\frac{5}{6}$ of $\frac{9}{10}$ to a ſingle Fraction.
Facit $\frac{135}{240}=\frac{9}{16}$.

29. Reduce $\frac{4}{5}$ or $\frac{6}{8}$ of $\frac{7}{9}$ to a ſingle Fraction.
Facit $\frac{168}{360}=\frac{7}{15}$.

30. Reduce $\frac{2}{7}$ of $\frac{5}{9}$ of $\frac{8}{10}$ to a ſingle Fraction.
Facit $\frac{80}{630}=\frac{8}{63}$.

6 *To reduce Fractions of one Denomination to the Fraction* *another*, but greater, *retaining the ſame Value.*

RULE. Reduce the given Fraction to a compound on by comparing it with all the Denominations between i and that Denomination which you would reduce it to then reduce that compound Fraction to a ſingle one.

EXAMPLES.

31. Reduce $\frac{7}{8}$ of a Penny to the Fraction of a Pound.
Facit $\frac{7}{8}$ of $\frac{1}{12}$ of $\frac{1}{20}=\frac{7}{1920}$ *l.*

32. Reduce $\frac{1}{4}$ of a Penny to the Fraction of a Pound.
Facit $\frac{1}{960}$ *l.*

33. Reduce $\frac{4}{5}$ of a *dwt.* to the Fraction of a *lb.* Troy.
Facit $\frac{4}{1200}$.

34. Reduce $\frac{4}{7}$ of a *lb.* Avoirdupoiſe to the Fraction of *cwt.*
Facit $\frac{4}{784}$ *cwt.*

7. *To reduce Fractions of one Denomination to the Fraction* *another*, but leſs, *retaining the ſame Value.*

RULE. Multiply the Numerator by the Parts containe in the ſeveral Denominations between it, and that y would reduce it to, for a new Numerator, and place it o the given Denominator.

Reduce the new Fraction to its loweſt Terms.

EXAMPLE

EXAMPLES.

35. Reduce $\frac{7}{120}$ of a £. to the Fraction of a Penny.
Facit $\frac{7}{8}$ of a Penny.

7×20×12=1680 $\frac{1680}{1920}$ *reduced to its loweſt Term* = $\frac{7}{8}$ *d.*

36. Reduce $\frac{1}{960}$ of a £. to the Fraction of a Penny.
Facit $\frac{1}{4}$ *d.*

37. Reduce $\frac{4}{1200}$ of a *lb.* Troy to the Fraction of a Penny-weight. *Facit* $\frac{4}{5}$ *dwt.*

38. Reduce $\frac{4}{784}$ of an *cwt.* to the Fraction of a *lb.*
Facit $\frac{4}{7}$ *lb.*

8. *To reduce Fractions of one Denomination to another of the ſame Value, having the Numerator given of the required Fraction.*

RULE. As the *Numerator* of the *given Fraction* : is to its *Denominator* : : ſo is the *Numerator* of the *intended Fraction* : o its *Denominator.*

EXAMPLES.

39. Reduce $\frac{2}{3}$ to a Fraction of the ſame Value, whoſe Numerator ſhall be 12. *As* 2 : 3 : : 12 : 18. *Facit* $\frac{12}{18}$.

40. Reduce $\frac{5}{7}$ to a Fraction of the ſame Value, whoſe Numerator ſhall be 25. *Facit* $\frac{25}{35}$.

41. Reduce $\frac{5}{7}$ to a Fraction of the ſame Value, whoſe Numerator ſhall be 47. *Facit* $\frac{47}{65\frac{4}{5}}$.

9. *To reduce Fractions of one Denomination to another of he ſame Value, having the Denominator given of the Fraction equired*

RULE. As the *Denominator* of the *given Fraction* : is to s *Numerator* : : ſo is the *Denominator* of the *intended Fraction* to its *Numerator.*

EXAMPLES.

42. Reduce $\frac{2}{3}$ to a Fraction of the ſame Value, whoſe Denominator ſhall be 18. *As* 3 : 2 : : 18 : 12. *Facit* $\frac{12}{18}$.

43. Reduce $\frac{5}{7}$ to a Fraction of the ſame Value, whoſe Denominator ſhall be 35. *Facit* $\frac{25}{35}$.

44. Reduce $\frac{5}{7}$ to a Fraction of the ſame Value, whoſe Denominator ſhall be 65 $\frac{4}{5}$. *Facit* $\frac{47}{65\frac{4}{5}}$.

10. *To reduce a mixed Fraction to a ſingle One.*

RULE. When the Numerator is the integral Part, multiply it by the Denominator of the fractional Part, adding in the Numerator of the fractional Part, for a new Numerator, then multiply the Denominator of the Fraction by the Denominator of the fractional Part for a new Denominator,

EXAMPLES.

45. Reduce $\frac{36\frac{2}{3}}{48}$ to a ſimple Fraction. *Facit* $\frac{110}{144}=\frac{55}{72}$.

$36\times3+2=110$ *Numerator.*
$48\times3\quad=114$ *Denominator.*

46. Reduce $\frac{23\frac{5}{7}}{38}$ to a ſimple Fraction. *Facit* $\frac{166}{266}=\frac{83}{133}$.

When the Denominator is the integral Part, multiply it by the Denominator of the fractional Part, adding in the Numerator of the fractional Part for a new Denominator, then multiply the Numerator of the Fraction by the Denominator of the fractional Part for a new Numerator.

EXAMPLES.

47. Reduce $\frac{47}{65\frac{4}{5}}$ to a ſimple Fraction. *Facit* $\frac{235}{329}=\frac{5}{7}$.

48. Reduce $\frac{19}{44\frac{1}{3}}$ to a ſimple Fraction. *Facit* $\frac{57}{133}=\frac{3}{7}$.

11. *To find the proper Quantity of a Fraction in the know Parts of an Integer.*

RULE. Multiply the Numerator by the common Parts of the Integer, and divide by the Denominator.

EXAMPLES.

49. Reduce $\frac{3}{4}$ of a Pound *Sterling* to its proper Quantit
$3\times20=60\div4=15$*s.* *Facit* 15*s.*

50. Reduce $\frac{2}{5}$ of a Shilling to its proper Quantity.
Facit 4*d.* 3 *qrs.*

51. Reduce $\frac{4}{7}$ of a *lb.* Avoirdupoiſe to its proper Quantit
Facit 9 *oz.* 2 *dr.*

52. Reduce $\frac{7}{9}$ of an *cwt.* to its proper Quantity.
Facit 3 *qrs.* 3 *lb.* 1 *oz.* 12 *dr.* $\frac{4}{9}$.

53. Redu

53. Reduce $\frac{3}{5}$ of a *lb.* Troy to its proper Quantity.
Facit 7 *oz.* 4 *dwt.*

54. Reduce $\frac{5}{9}$ of an Ell *Engliſh* to its proper Quantity.
Facit 2 *qrs.* 3 *nails*, $\frac{1}{9}$.

55. Reduce $\frac{4}{5}$ of a Mile to its proper Quantity.
Facit 6 *furl.* 16 *poles.*

56. Reduce $\frac{5}{8}$ of an Acre to its proper Quantity.
Facit 2 *roods* 20 *poles.*

57. Reduce $\frac{6}{7}$ of an Hogſhead of Wine to its proper Quantity.
Facit 54 *Gallons.*

58. Reduce $\frac{3}{9}$ of a Barrel of Beer to its proper Quantity.
Facit 12 *Gallons.*

59. Reduce $\frac{5}{12}$ of a Chaldron of Coals to its proper Quantity.
Facit 15 *Buſh.*

60. Reduce $\frac{3}{5}$ of a Month to its proper Quantity.
Facit 2 *Weeks*, 2 *Days*, 19 *Hours* $\frac{1}{5}$.

12. *To reduce any given Quantity to the Fraction of any greater Denomination retaining the ſame Value.*

RULE. Reduce the given Quantity to the loweſt Term mentioned for a Numerator, under which ſet the Integral Part (reduced to the ſame Term) for a Denominator, and it will give the Fraction required.

EXAMPLES.

61. Reduce 15*s.* to the Fraction of a Pound *Sterling.*
Facit $\frac{15}{20}=\frac{3}{4}$ £.

62. Reduce 4*d.* 3 *qrs.* $\frac{1}{5}$ to the Fraction of a Shilling.
Facit $\frac{2}{5}$.

63. Reduce 9 *oz.* 2 *dr.* $\frac{2}{7}$ to the Fraction of a *lb.* Avoirdupoiſe.
Facit $\frac{4}{7}$.

64. Reduce 3 *qrs.* 3 *lb.* 1 *oz.* 12 *dr.* $\frac{4}{9}$ to the Fraction of an *cwt.*
Facit $\frac{7}{9}$.

65. Reduce 7 *oz.* 4 *dwt.* to the Fraction of a *lb.* Troy.
Facit $\frac{3}{5}$.

66. Reduce 2 *qrs.* 3 *nails* $\frac{1}{9}$ to the Fraction of an *Engliſh* Ell.
Facit $\frac{5}{9}$.

67. Reduce 6 *furl.* 16 *poles* to the Fraction of a Mile.
Facit $\frac{4}{5}$.

68. Reduce 2 *roods* 20 *poles* to the Fraction of an Acre.
Facit $\frac{5}{8}$.

69. Reduce 54 *Gallons* to the Fraction of an Hogſhead f Wine.
Facit $\frac{6}{7}$.

70. Reduce 12 *Gallons* to the Fraction of a Barrel of Beer. *Facit* $\frac{1}{3}$.

71. Reduce 15 *Buſh.* to the Fraction of a Chaldron of Coals. *Facit* $\frac{5}{12}$.

72. Reduce 2 *Weeks*, 2 *Days*, 19 *Hours*, $\frac{1}{5}$ to the Fraction of a Month. *Facit* $\frac{3}{5}$.

ADDITION *of* VULGAR FRACTIONS.

RULE 1. REDUCE the given Fractions to a common Denominator, then add all the Numerators together, under which place the common Denominator.

EXAMPLES.

1. Add $\frac{2}{3}$ and $\frac{5}{7}$ together. *Facit* $\frac{14}{21}+\frac{15}{21}=\frac{29}{21}=1\frac{8}{21}$
2. Add $\frac{3}{4}$, $\frac{2}{7}$ and $\frac{5}{6}$ together. - - - - - - - *Facit* $1\frac{146}{168}$.
3. Add $\frac{1}{5}$, $4\frac{1}{3}$ and $\frac{2}{5}$ together. - - - - - - - *Facit* $4\frac{70}{75}$.
4. Add $7\frac{2}{3}$ and $\frac{2}{5}$ together. - - - - - - - - *Facit* $8\frac{1}{15}$.
5. Add $\frac{2}{7}$ and $\frac{2}{3}$ of $\frac{3}{4}$ together. - - - - - - - *Facit* $\frac{11}{14}$.
6. Add $5\frac{2}{3}$, $6\frac{7}{8}$ and $4\frac{1}{2}$ together. - - - - *Facit* $17\frac{1}{24}$.

2. When the Fractions are of ſeveral Denominations, reduce them to their proper Quantities, and add as before.

7. Add $\frac{3}{4}$ of a Pound to $\frac{5}{6}$ of a Shilling. *Facit* 15*s.* 10*d.*
8. Add $\frac{1}{2}$ of a Penny to $\frac{2}{3}$ of a Pound. *Facit* 13*s.* 4*d* $\frac{1}{2}$.
9. Add $\frac{3}{4}$ of a Pound Troy to $\frac{1}{6}$ of an Ounce. *Facit* 9 *oz.* 3 *dwt.* 8 *gr.*
10. Add $\frac{4}{5}$ of a Ton to $\frac{5}{6}$ of a *lb.* *Facit* 16 *cwt.* 0 *qr.* 0 *lb.* 13 *oz.* 5 *dr.* $\frac{1}{3}$.
11. Add $\frac{2}{3}$ of a Chaldron to $\frac{3}{4}$ of a Buſhel. *Facit* 24 *buſh.* 3 *pecks.*
12. Add $\frac{1}{6}$ of a Yard to $\frac{2}{3}$ of an Inch. *Facit* 6 *inch.* 2 *bar.* *c.*

SUBTRACTION *of* VULGAR FRACTIONS.

RULE 1. REDUCE the given Fractions to a common Denominator, then ſubtract the leſs Numerator from the greater, and place the Remainder over the common Denominator.

2. When the lower Fraction is greater than the upper, ſubtract the Numerator of the lower Fraction from the Denominator,

nominator, and to that Difference add the upper Numerator, carrying one to the Units Place of the lower whole Number.

EXAMPLES.

1. From $\frac{3}{4}$, take $\frac{5}{7}$. $3\times7=21$. $5\times4=20$. $21-20=1$ *num.* $4\times7=28$ *den.* *Facit* $\frac{1}{28}$.
2. From $\frac{5}{6}$ take $\frac{3}{5}$ of $\frac{1}{8}$. - - - - - - - - - - *Facit* $\frac{11}{24}$.
3. From $5\frac{2}{3}$ take $\frac{9}{10}$. - - - - - - - - - - *Facit* $4\frac{23}{30}$.
4. From $\frac{38}{47}$ take $\frac{3}{5}$. - - - - - - - - - - - *Facit* $\frac{49}{235}$.
5. From $\frac{19}{20}$ take $\frac{1}{7}$ of $\frac{2}{3}$. - - - - - - - - - *Facit* $\frac{359}{420}$.
6. From $64\frac{1}{4}$ take $\frac{2}{3}$ of $\frac{3}{4}$. - - - - - - - *Facit* $63\frac{3}{4}$.

When the Fractions are of ſeveral Denominations, reduce them to their proper Quantities, and ſubtract as before.

7. From $\frac{3}{4}$ of a Pound take $\frac{3}{4}$ of a Shilling. *Facit* 14*s.* 3*d.*
8. From $\frac{2}{3}$ of a Shilling take $\frac{1}{2}$ of a Penny. *Facit* 7*d* $\frac{1}{2}$
9. From $\frac{3}{4}$ of a *lb.* Troy, take $\frac{1}{6}$ of an *Ounce*. *Facit* 8 *oz.* 16 *dwts.* 16 *grs.*
10. From $\frac{4}{5}$ of a Ton, take $\frac{5}{6}$ of a *lb.* *Facit* 15 *cwt.* 3 *qrs.* 27 *lb.* 2 *oz.* 10 *dr.* $\frac{2}{3}$.
11. From $\frac{2}{3}$ of a Chaldron, take $\frac{3}{4}$ of a Buſhel. *Facit* 23 *buſh.* 1 *peck.*
12. From $\frac{1}{6}$ of a Yard, take $\frac{2}{3}$ of an Inch. *Facit* 5 *in.* 1 *bc.*

MULTIPLICATION *of* VULGAR FRACTIONS.

RULE. PREPARE the given Numbers (if they require it) by the Rules of Reduction, then multiply the Numerators together for a new Numerator, and the Denominators for a new Denominator.

Note. *When any Number, either whole or mixed, is multiplied by a Fraction, the Product will be always leſs than the Multiplicand, in the ſame Proportion as the multiplying Fraction is leſs than an Unit.*

EXAMPLES.

1. Multiply $\frac{3}{4}$ by $\frac{3}{5}$. *Fa.* $3\times3=9$ *num.* $4\times5=20$ *den.* $=\frac{9}{20}$.
2. Multiply $\frac{7}{9}$ by $\frac{2}{3}$. - - - - - - *Facit* $\frac{14}{27}$.
3. Multiply $48\frac{3}{5}$ by $13\frac{5}{6}$. - - *Facit* $672\frac{9}{30}$.
4. Multiply $430\frac{6}{10}$ by $18\frac{3}{7}$. - *Facit* $7935\frac{24}{70}$.

5. Multiply

5. Multiply $\frac{16}{21}$ by $\frac{3}{4}$ of $\frac{5}{7}$ of $\frac{4}{5}$. - - - - - - - *Facit* $\frac{96}{294}=\frac{16}{49}$.
6. Multiply $\frac{9}{10}$ by $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{5}{6}$. - - - - - - - *Facit*. $\frac{3}{8}$.
7. Multiply $\frac{3}{4}$ of $\frac{2}{3}$ by $\frac{2}{3}$ of $\frac{1}{3}$. - - - - - - - - *Facit* $\frac{1}{9}$.
8. Multiply $\frac{1}{4}$ of $\frac{3}{8}$ by $\frac{5}{7}$ - - - - - - - - - *Facit* $\frac{15}{224}$.
9. Multiply $5\frac{6}{7}$ by $\frac{5}{6}$. - - - - - - - - - - *Facit* $4\frac{37}{42}$.
10. Multiply 24 by $\frac{2}{3}$ - - - - - - - - - - - *Facit* 16.
11. Multiply $\frac{3}{4}$ of 9 by $\frac{7}{8}$. - - - - - - - - - *Facit* $5\frac{29}{32}$.
12. Multiply $9\frac{1}{2}$ by $\frac{2}{6}$. - - - - - - - - - - *Facit* $3\frac{1}{6}$.

DIVISION *of* VULGAR FRACTIONS.

RULE. PREPARE the given Numbers (if they require it) by the Rules of Reduction, then multiply the Denominator of the Diviſor into the Numerator of the Dividend for a new Numerator, and the Numerator of the Diviſor into the Denominator of the Dividend for a new Denominator.

Note. *When any whole Number is divided by a Fraction leſs than Unity, the Quotient will be greater than the Dividend. But if any Fraction be divided by a whole Number greater than Unity, the Quotient will be leſs than the Dividend.*

EXAMPLES.

1. Divide $\frac{9}{20}$ by $\frac{3}{5}$, $5\times9=45$, *num.* $3\times20=60$ *den.* $\frac{45}{60}=\frac{3}{4}$.
2. Divide $\frac{14}{27}$ by $\frac{2}{3}$. - - - - - - - - - - - - - - *Facit* $\frac{7}{9}$.
3. Divide $672\frac{9}{30}$ by $13\frac{5}{6}$ - - - - - - - - - *Facit* $48\frac{3}{5}$.
4. Divide $7935\frac{24}{70}$ by $18\frac{3}{7}$ - - - - - - - - - *Facit* $430\frac{3}{5}$.
5. Divide $\frac{3}{8}$ by $\frac{2}{3}$ of $\frac{3}{4}$ of $\frac{5}{6}$. - - - - - - - - - *Facit* $\frac{9}{10}$.
6. Divide $\frac{2}{3}$ of 16 by $\frac{5}{7}$ of $\frac{3}{4}$. - - - - - - - - *Facit* $19\frac{41}{45}$.
7. Divide $\frac{1}{2}$ of $\frac{2}{3}$ by $\frac{2}{3}$ of $\frac{3}{4}$. - - - - - - - - *Facit* $\frac{24}{36}=\frac{2}{3}$.
8. Divide $9\frac{2}{12}$ by $\frac{1}{2}$ of 7. - - - - - - - - - *Facit* $2\frac{13}{21}$.
9. Divide $\frac{9}{16}$ by $4\frac{1}{2}$. - - - - - - - - - - - - - *Facit* $\frac{1}{8}$.
10. Divide 16 by 24. - - - - - - - - - - - - - *Facit* $\frac{2}{3}$.
11. Divide $5205\frac{2}{10}$ by $\frac{4}{5}$ of 91. - - - - - - - *Facit* $71\frac{1}{2}$.
12. Divide $3\frac{1}{6}$ by $9\frac{1}{2}$. - - - - - - - - - - - - *Facit* $\frac{1}{3}$.

The SINGLE RULE *of* THREE DIRECT, *in* VULGAR FRACTIONS.

RULE. REDUCE the Numbers as before directed in Reduction, ſo that the firſt and third may be of the ſame Name, multiply the Numerator of the firſt Fraction by the Denominator of the ſecond and third, for a new Denominator; then multiply the Denominator of the firſt Fraction by the Numerator of the ſecond and third for a new Numerator; that Fraction will be the Anſwer to the Queſtion, which reduce to its proper Quantity—*or*, when the 3 Terms are properly reduced, proceed as in the Rule of Three of whole Numbers.

EXAMPLES.

1. If $\frac{3}{4}$ of a Yard coſt $\frac{5}{8}$ of a £. what will $\frac{9}{10}$ of a Yard come to at that Rate? *Anſ.* $\frac{18}{24}=15$ *s.*

$\frac{3}{4}$ *yd.* : $\frac{5}{8}$ £. : : $\frac{9}{10}$ *yd.* : $\frac{18}{24}$ £.

for $4\times5\times9=180$ *num.*
and $3\times8\times10=240$ *den.* *or* $\frac{5}{8}\times\frac{9}{10}=\frac{45}{80}\ \frac{3}{4})\frac{45}{80}(\frac{180}{240}$.

2. If $\frac{5}{6}$ of a Yard coſt $\frac{2}{3}$ £. what will $\frac{11}{12}$ of a Yard coſt? *Anſ.* 14*s.* 8*d.*

3. If $\frac{3}{4}$ of a Yard of Lawn coſt 7*s.* 3*d.* what will 10 Yards $\frac{1}{3}$ coſt? *Anſ.* £4..19..10$\frac{1}{2}$ $\frac{2}{3}$.

4. If $\frac{7}{8}$ *lb.* coſt $\frac{3}{4}$ *s.* how many Pound will $\frac{8}{9}$ of *s.* buy? *Anſ.* 1 *lb.* $\frac{8}{216}$.

5. If $\frac{3}{5}$ Ell of Holland coſt $\frac{1}{3}$ £. what will 12 Ells $\frac{2}{3}$ coſt at that Rate? *Anſ.* £7..–..8 $\frac{3}{4}$ $\frac{15}{27}$.

6. If 12 $\frac{1}{2}$ Yards of Cloth coſt 15 *s.* 9 *d.* what will 48 $\frac{1}{4}$ coſt at the ſame Rate? *Anſ.* £3..–..9 $\frac{1}{2}$ $\frac{16}{100}$.

7. If $\frac{9}{10}$ of *cwt.* coſt 284*s.* what will 7 *cwt.* $\frac{1}{2}$ coſt at the ſame Rate? *Anſ.* £118..6..8.

8. If 3 Yards of Broad-cloth coſt £ 2 $\frac{4}{5}$, what will 10 ards $\frac{2}{7}$ coſt? *Anſ.* £9..12..–.

9. If $\frac{1}{4}$ of a Yard coſt $\frac{2}{3}$ of a £. what will $\frac{3}{5}$ of an Ell *Engliſh* come to at the ſame Rate? *Anſ.* £2.

10. If 1 *lb.* of Cochineal coſt £1..5..–, what will 36 *lb.* $\frac{7}{10}$ come to? *Anſ.* £45..17..6.

11. If 1 Yard of Broad-cloth coſt 15*s.* $\frac{5}{8}$, what will 4 Pieces coſt, each containing 27 Yards $\frac{3}{7}$? *Anſ.* £85..14.. 3$\frac{1}{4}$ $\frac{40}{56}$.

12. Bought 3 Pieces $\frac{1}{2}$ of Silk, each containing 24 Ells , at 6*s.* 0*d.* $\frac{3}{4}$ *per* Ell, I deſire to know what the whole uantity coſt? *Anſ.* £25..17..2$\frac{1}{4}$ $\frac{15}{16}$.

The SINGLE RULE *of* THREE INVERSE, *in* VULGAR FRACTIONS.

EXAMPLES.

1. IF 48 Men can build a Wall in 24 Days $\frac{1}{4}$, how many Men can do the ſame in 192 Days? *Anſ.* 6 *Men* $\frac{48}{768}$.

2. If 25*s.* $\frac{2}{7}$ will pay for the Carriage of an *cwt.* 145 Miles $\frac{1}{4}$, how far may 6 *cwt.* $\frac{1}{2}$ be carried for the ſame Money? *Anſ.* 22 *Miles* $\frac{9}{26}$.

3. If 3 $\frac{1}{4}$ Yards of Cloth, that is 1 $\frac{1}{5}$ Yard wide, be ſufficient to make a Cloak, how much muſt I have of that Sort which is $\frac{4}{5}$ Yard wide, to make another of the ſame Bigneſs? *Anſ.* 4 $\frac{7}{8}$ *Yards.*

4. If 3 Men can do a Piece of Work in 4 Hours $\frac{1}{2}$, in how many Hours will 10 Men do the ſame Work? *Anſ.* 1 *Hour* $\frac{7}{20}$.

5. If a Penny white Loaf weigh 7 *oz.* when a Buſhel of Wheat coſt 5*s.* 6*d.* what is the Buſhel worth when the Penny white Loaf weighs but 2 *oz.* $\frac{1}{2}$? *Anſ.* 15*s.* 4*d.* $\frac{4}{5}$.

6. What Quantity of Shalloon that is $\frac{3}{4}$ Yard wide will line 7 $\frac{1}{2}$ Yard of Cloth that is 1 $\frac{1}{2}$ Yard wide? *Anſ.* 15 *Yards.*

The DOUBLE RULE *of* THREE *in* VULGAR FRACTIONS.

EXAMPLES.

1. IF a Carrier receives £2 $\frac{1}{10}$ for the Carriage of 3 *cwt.* 150 Miles, how much ought he to receive for the Carriage of 7 *cwt.* 3 *qrs* $\frac{1}{2}$ 50 Miles? *Anſ.* £1..16..9.

2. If £100 in 12 Months gain £6 Intereſt, what Principal will gain £3 $\frac{3}{8}$ in 9 Months? *Anſ.* £75.

3. If 9 Students ſpend £10 $\frac{7}{9}$ in 18 Days, how much will 20 Students ſpend in 30 Days? *Anſ.* £39..18..4. $\frac{360}{1458}$.

4. A Man and his Wife having laboured one Day, earned 4*s.* $\frac{5}{8}$, how much muſt they have for 10 Days $\frac{1}{2}$, when their two Sons help them? *Anſ* £4..17..1 $\frac{1}{2}$.

5. If £50 in 5 Months gain £2 $\frac{37}{144}$ what Time will £13 $\frac{1}{3}$ require to gain £1 $\frac{1}{12}$? *Anſ.* 9 *Months.*

6. If the Carriage of 60 *cwt.* 20 Miles coſt £14 $\frac{1}{2}$, what Weight can I have carried 30 Miles for £5 $\frac{7}{16}$? *Anſ.* 15 *cwt.*

William Cornish
17 73

THE

UTOR's ASSISTANT.

PART III.

ECIMAL FRACTIONS.

N Decimal Fractions the Integer or whole thing, as one Pound, one Yard, one Gallon, *&c.* is ſuppoſed to divided into ten equal Parts, and thoſe Parts into nths, and ſo on without End.

So that the Denominator of a Decimal being always own to conſiſt of an Unit, with as many Cyphers as the merators has Places, therefore is never ſet down, the rts being only diſtinguiſhed from whole Numbers by a mma prefixed; thus ,5 which ſtands for $\frac{5}{10}$,25 for $\frac{25}{100}$, 23 for $\frac{123}{1000}$.

But the different Value of Figures appear plainer by following Table.

Whole Numbers.		Decimal Parts.	
7	*Millions.*	2	*Parts of Tens.*
6	*C Thouſands.*	3	*Parts of Hundreds.*
5	*X Thouſands.*	4	*Parts of Thouſands.*
4	*Thouſands.*	5	*Parts of X Thouſands.*
3	*Hundreds.*	6	*Parts of C Thouſands.*
2	*Tens.*	7	*Parts of Millions.*
1	*Units.*		

From which it plainly appears, that as whole Numbers i creaſe in a ten-fold Proportion to the Left-Hand, Deci Parts decreaſe in a ten-fold Proportion to the Right-Ha ſo that Cyphers placed before Decimal Parts decreaſe th Value, by removing them farther from the Comma Unit's Place; thus, ,5 is 5 Parts of 10, or $\frac{5}{10}$. ,05 i Parts of 100, or $\frac{5}{100}$. ,005 is 5 parts of 1000, or ,0005 is 5 Parts of 10000, or $\frac{5}{10000}$. But Cyphers af Decimal Parts do not alter their Value. For, ,5 ,50 ,50 &c. are each but $\frac{5}{10}$ of the Unit.

A FINITE DECIMAL is that which ends at a certain Nu ber of Places, but an Infinite is that which no where en

A RECURRING DECIMAL is that wherein one or mo Figures are continually repeated, as 2,75222.

And 52, 275275275 is called a compound recurri Decimal.

Note. *A finite Decimal may be conſidered as infinite, making Cyphers to recur, for they do not alter the Value of t Decimal.*

In all Operations, if the reſult conſiſts of ſeveral Nines, r ject them, and make the next ſuperior Place an Unit mor thus, for 26,25999, write 26,6.

In all circulating Numbers, daſh the firſt Figure; thu 86,54$\cancel{6}$66.

ADDITION *of* DECIMALS.

RULE. IN ſetting down the propoſed Numbers to be adde great Care muſt be taken in placing every Fig directly underneath thoſe of the ſame Value, whether th be mixed Numbers, or pure Decimal Parts, and to perfor which there muſt be a due Regard had to the Comma or ſeparating Points, which ought always to ſtand in a d rect Line, one under another, and to the Right-Hand them carefully place the Decimal Parts, according to th reſpective Values, then add them as in whole Numbers.

EXAMPLES.

1. Add 72,5 + 32,071 + 2,1574 + 371,4 + 2,75 *Facit* 480,87
2. Add 30,07 + 2,0071 + 59,4 + 3207,1.
3. Ad 3,5 + 47,25 + 927,01 + 2,0073 + 1,5.
4. Add 52,75 + 47,21 + 724 + 31,452 + ,3075.
5. Add 3275 + 27,514 + 1,005 + 725 + 7,32.
6. Add 27,5 + 52 + 3,2075 + ,5741 + 2720.

SUBTRACTION *of* DECIMALS.

RULE. SUBTRACTION of Decimals differs but little from whole Numbers, only in placing your Numbers, which muſt be carefully obſerved, as in Addition.

EXAMPLES.

1. From ,2754 take ,2371 5. From 571 take 54,72
2. From 2,37 take 1,76 6. From 625 take 76,91
3. From 271 take 215,7 7. From 23.415 take ,3742
4. From 270,2 take 75,4075 8. From ,107 take ,0007

MULTIPLICATION *of* DECIMALS.

RULE. PLACE the Factors, and multiply them as in whole Numbers, and from the Product towards the Right-Hand, cut off as many Places for Decimals as there are in both Factors together; but if there ſhould not be ſo many Places in the Product, ſupply the Defect with Cyphers to the Left-Hand.

EXAMPLES.

1. Multiply ,2365 by ,2435. *Facit* ,05758775.

2. Multiply 2,071 by 2,27 7. Multiply 27,35 by 7,0001
3. Multiply 27,15 by 25,3 8. Multiply 5,721 by ,0075
4. Multiply 79,347 by 23,15 9. Multiply ,007 by ,007
5. Multiply 17105 by ,3257 10. Multiply 2,015 by ,2705
6. Multiply 17105 by ,0237 11. Multiply ,0007 by ,0025

When any Number of Decimals is to be multiplied by 10, 100, 1000, *&c.* it is only removing the ſeparating Point in the Multiplicand, ſo many Places towards the Right-Hand, as there are Cyphers in the Multipliers: thus, ,578 × 10 = 5,78 ,578 × 100 = 57,8 ,578 × 1000 = 578, ,578 × 10000 = 5780.

Contracted MULTIPLICATION DECIMALS.

RULE. PUT the Units Place of the multiplier unde that Place of the Multiplicand that is intende to be kept in the Product; then invert the Order of all t other Figures, *i. e.* write them all the contrary Way; th in multiplying, begin at the Figure in the Multiplican which ſtands over the Figure you are then multiplyin withal, and ſet down the firſt Figure of each particular Pro duct, directly one under the other, and have a due Regar to the Increaſe ariſing from the Figures on the Right-Han of that Figure you begin to multiply at in the Multiplican

Note, *That in multiplying the Figure left out every Ti next the Right-Hand in the Multiplicand, if the Product be or upwards, to* 15 *carry* 1; *if* 15, *or upwards, to* 25 *carry and if* 25, *or upwards, to* 35 *carry* 3, &c.

EXAMPLES.

12. Multiply 384,672158 by 36,8345 and let there be on 4 Places of Decimals in the Product. *Facit* 14169,206

Contacted Way.	*Common Way.*	
384,672158	384,672158	
5438,63	36,8345	
115401647	1923	360790
23080329	15386	88632
3077377	115401	6474
115402	3077377	264
15387	23080329	48
1923	115401647	4
14169,2065	14169,2066	038510

13. Multiply 3,141592 by 52,7438 and leave only Places of Decimals. *Facit* 165,6994.

14. Multiply 2,38645 by 8,2175 and leave only 4 Pla of Decimals. *Facit* 19,6107.

15. Multiply 375,13758 by 16,7324 and let there only one Place of Decimals. *Facit* 6276,9.

16. Multiply 375,13758 by 16,7324 and leave only Places of Decimals. *Facit* 6276,952

17. Multiply 395,3756 by ,75642 and let there be o 4 Places of Decimals. *Facit* 299,0699.

DIVISION *of* DECIMALS.

THIS Rule is alſo worked as in whole Numbers, the only Difficulty is in valuing the Quotient, which is one by either of the following general Rules.

RULE. 1. The firſt Figure in the Quotient is always of he ſame Value with that Figure of the Dividend, which nſwers or ſtands over the Place of Units in the Diviſor.

2. The Quotient muſt always have ſo many Decimal laces, as the Dividend has more than the Diviſor.

Note. *If the Diviſor and Dividend have both the ſame Numer of Decimal Parts, the Quotient will be a whole Number.*

2. *If the Dividend hath not ſo many Places of Decimals as re in the Diviſor, then ſo many Cyphers muſt be annexed to he Dividend, as will make them equal, and the Quotient will hen be all a whole Number.*

3. *But if when the Diviſion is done, the Quotient has not o many Figures as it ſhould have Places of Decimals, then ſo any Cyphers muſt be prefixed as there are Places wanting.*

EXAMPLES.

1. Divide 85643,825 by 6,321. *Facit* 13549.

2. Divide 48 by 144
3. Divide 217,75 by 65
4. Divide 125 by ,1045
5. Divide ,709 by 2,574
6. Divide 5,714 by 8725
7. Divide 7382,54 by 6,4252
8. Divide,0851643 8 by 423
9. Divide 267,15975 by 13,25
10. Divide 72,1564 by ,1347
11. Divide 715 by ,3075

When Numbers are to be divided by 10, 100, 1000, 0000, &c. it is performed by the placing the ſeparating oint in the Dividend ſo many Places towards the Left-and, as there are Cyphers in the Diviſor.

Thus, $5784 \div 10 = 578,4$ $5784 \div 1000 = 5,784$
$5784 \div 100 = 57,84$ $5784 \div 10000 = ,5784$

Contracted DIVISION *of* DECIMALS.

RULE. BY the firſt Rule, find what is the Value of the firſt Figure in the Quotient; then by knowing the firſt Figure's Denomination, the Decimal Places may be reduced to any Number, by taking as many of the Left-Hand Figures of the Dividend as will anſwer them: And in dividing, omit one Figure of the Diviſor at each following Operation.

Note, *That in multiplying every Figure left out in the Diviſor, you muſt carry* 1, *if it be* 5, *or upwards, to* 15; *if* 15, *or upwards, to* 25 *carry* 2; *if* 25, *or upwards, to* 35 *carry* 3, &c.

EXAMPLES.

12. Divide 721,17562 by 2,257432, and let there be only three Places of Decimals in the Quotient.

Contracted.	*Common Way.*
2,257432)721,17562(319,467	2,257432)721,17562(319,46
. 6772296	6772296
439460 .	439460 2
225743 .	225743 2
213717 . .	213717 00
203169 . .	203168 88
10548 . . .	10548 120
9030 . . .	. 9029 728
1518	1518 3920
1354	1354 4592
164	163 93280
158	158 02024
. 6	. . 5 91256

13. Divide 8,758615 by 5,2714167
14. Divide 51717591 by 8,7586
15. Divide 25,1367 by 217,35
16. Divide 514,7549 by ,123415
17. Divide 70,23 - - by 7,9863
18. Divide 27,104 - by 3,712

REDUCTION *of* DECIMALS.

To reduce a Vulgar Fraction to a Decimal.

RULE. ADD Cyphers to the Numerator, and divide by the Denominator, the Quotient is the Decimal Fraction required.

EXAMPLES.

1. Reduce $\frac{1}{4}$ - - - to a Decimal. 4)1,00(,25 *Facit.*
2. Reduce $\frac{1}{2}$ - - - to a Decimal. *Facit* ,5
3. Reduce $\frac{3}{4}$ - - - to a Decimal. *Facit* ,75
4. Reduce $\frac{3}{8}$ - - - to a Decimal. *Facit* ,375
5. Reduce $\frac{5}{26}$ - - - to a Decimal. *Facit* ,1923076+
6. Reduce $\frac{11}{14}$ of $\frac{10}{13}$ to a Decimal. *Facit* ,6043956+

NOTE. *If the given Parts are of ſeveral Denominations, they may be reduced either by ſo many diſtinct Operations, as there are different Parts, or by firſt reducing them into their loweſt Denomination, and then divide as before; or,*

2dly, *Bring the loweſt into Decimals of the next ſuperior Denomination, and on the Right-hand of the Decimal found, place the Parts given of the next ſuperior Denomination, ſo proceeding till you bring out the Decimal Parts of the higheſt Integer required by ſtill dividing the Product by the next ſuperior Denominator; or*

3dly, *To reduce Shillings, Pence, and Farthings; if the Number of Shillings be even, take Half for the firſt Place of Decimals, and let the ſecond and third Places be filled up with the Farthings contained in the remaining Pence and Farthings, always remembring to add* 1, *when it is or exceeds* 25*: But if the Number of Shillings be odd, the ſecond Place of Decimals muſt be increaſed by* 5.

7. Reduce 5 *s.* to the Decimal of a £. *Facit* ,25
8. Reduce 9 *s.* to the Decimal of a £. *Facit* ,45
9. Reduce 16 *s.* to the Decimal of a £. *Facit* ,8

10. Reduce

10. Reduce 8*s.* 4*d.* to the Decimal of a £. *Facit* ,4166.

11. Reduce 16*s.* 7*d.* $\frac{3}{4}$ to the Decimal of a £.
Facit ,8322916.

firſt.	*ſecond.*	*third.*
16*s.* 7*d.* $\frac{3}{4}$.	4)3,00	2)16
12	——	——
——	12)7,75	,832
199	——	
4	2|0)16,64583	
——	——	
960)799(,8322916	,8322916	

12. Reduce 19*s.* 5*d.* $\frac{1}{2}$. to the Decimal of a £.
Facit ,972916.

13. Reduce 12 Grains to the Decimal of a *lb.* Troy.
Facit ,002083.

14. Reduce 12 Drams to the Decimal of a *lb.* Avoirdupoiſe. *Facit* ,046875.

15. Reduce 2 Quarters, 14 *lb.* to the Decimal of an *Cwt.* *Facit* ,625.

16. Reduce 2 Furlongs, to the Decimal of a League.
Facit ,0833.

17. Reduce 2 Quarts, 1 Pint to the Decimal of a Gallon.
Facit ,625.

18. Reduce 4 Gallons, 2 Quarts of Wine, to the Decimal of an Hogſhead. *Facit* ,071428+.

19. Reduce 2 Gallons, 1 Quart of Beer, to the Decimal of a Barrel. *Facit* ,0625.

20. Reduce 52 Days to the Decimal of a Year.
Facit ,142465+.

To find the Value of any Decimal Fraction *in the known Parts of an* Integer.

RULE. Multiply the Decimal given by the Number of Parts of the next inferior Denomination, cutting off the Decimals from the Product; then multiply the Remainder by the next inferior Denomination, thus proceeding till you ave brought it in the leaſt known Parts of an Integer.

EXAMPLES.

21. What is the Value of ,8322916 of a £. *Anſ.* 16s *d.* ½+

```
 ,8322916
       20
---------
16,6458320
       12
---------
 7,7499840
        4
---------
½,9999360
```

22. What is the Value of ,002084 of a *lb.* Troy?
Anſ. 12,00384 *qrs.*

23. What is the Value of ,046875 of a *lb.* Avoirdupoiſe?
Anſ. 12 *Drams.*

24. What is the Value of ,625 of an *Cwt.*?
Anſ. 2 *qrs.* 14 *lb.*

25. What is the Value of ,625 of a Gallon?
Anſ. 2 *quarts,* 1 *pint.*

26. What is the Value of ,071428 of a Hogſhead of Wine?
Anſ. 4 *Gallons,* 1 *quart,* ,999856.

27. What is the Value of ,0625 of a Barrel of Beer?
Anſ. 2 *gallons,* 1 *quart.*

28. What is the Value of ,142465 of a Year?
Anſ. 51,999725 *days.*

Decimal TABLES *of* COIN, WEIGHT *and* MEASURE.

TABLE I.
ENGLISH COIN.
1 *L.* the Integer.

Sh.	*dec.*	*Sh.*	*dec.*
19	,95	9	,45
18	,9	8	,4
17	,85	7	,35
16	,8	6	,3
15	,75	5	,25
14	,7	4	,2
13	,65	3	,15
12	,6	2	,1
11	,55	1	,05
10	,5		

Pence.	*Decimals.*
6	,025
5	,020833
4	,01666
3	,0125
2	,008333
1	,004166

Farthings.	*Decimals.*
3	,003125
2	,0020833
1	,0010416

TABLE II.
ENG. COIN. 1 *Sh.*
Long Mea. 1 *Foot.*
The Integer.

Pence and *Inches.*	*Decimals.*
6	,5
5	,416666
4	,333333
3	,25
2	,166666
1	,083333

Farthings.	*Decimals.*
3	,0625
2	,041666
1	,020833

TABLE III.
TROY WEIGHT.
1*lb.* The Integer.

Ounces the same as Pence in the last Table.

Penny weight.	*Decimals.*
10	,041666
9	,0375
8	,033333
7	,029166
6	,025
5	,020833
4	,016666
3	,0125
2	,008333
1	,004166

Grains.	*Decimals.*
12	,002083
11	001910
10	,001736
9	,001562
8	,001389
7	,001215
6	,001042
5	,000868
4	,000694
3	,000521
2	,000347
1	,000173

1 Oz. the Integer.
Penny wt. the same as Sh. in the first Table.

Grains.	*Decimals.*
12	,025
11	,022916
10	,020833
9	,01875
8	,016666
7	,014583
6	.0125
5	,010416
4	.008333
3	,00625
2	,004166
1	,00208

TABLE IV.
AVOIRDUP. W
112*lb.* the Integer

Qrs.	*Decimal*
3	,75
2	,5
1	,25

Pounds.	*Decimal*
14	,125
13	,116071
12	,107143
11	,098214
10	,089286
9	,08035
8	,071428
7	,0625
6	,053571
5	,044643
4	,035714
3	,026786
2	,017857
1	,008928

Ounces.	*Decim*
8	0044
7	0039

6	,003348
5	,002790
4	,002232
3	,001674
2	,001116
1	,000558

¼ *Oz.*	*Decimals*
3	,000418
2	,000279
1	,000139

TABLE V.

AVOIRDUP. Wt.

1 *lb.* the Integer.

Ounces.	*Decimals*
8	,5
7	,4375
6	,375
5	,3125
4	,25
3	,1875
2	,125
1	,0625

Drams.	*Decimals*
8	,03215
7	,027343
6	,023437
5	,019531
4	,015625
3	,011718
2	,007812
1	,003906

TABLE VI.

LIQUID MEAS.

1 Tun the Integer.

Gallons.	*Decimals*
100	,396827
90	,357141
80	,317460
70	,27
60	,238095
50	,198412
40	,158730
30	,119047
20	,079365
10	,039682
9	,035714
8	,031746
7	,027
6	,023809
5	,019841
4	015873
3	,011904
2	,007936
1	,003968

Pints.	*Decimals*
4	,001984
3	,001488
2	,000992
1	,000496

A Hogshead the Integer.

Gallons	*Decimals*
30	,476190
20	,317460
10	,158730
9	,142857
8	,126984
7	,111111
6	,095238
5	,079365
4	,063492
3	,047619
2	,031746
1	,015873

Pints.	*Decimals.*
3	,005952
2	,003968
1	,001984

TABLE VII.

MEASURE.

Liquid. *Dry.*

1 *Gallon,* 1 *Quarter.*
Integer.

Pints	*Decim.*	*Buſh.*
4	,5	4
3	,375	3
2	,25	2
1	,125	1

Q.pt	*Decim*	*Peck.*
3	,09375	3
2	,0625	2
1	,03125	1

Decimals.	*Q. Pk.*
,0234375	3
,015625	2
,0078125	1

Decimals.	*Pints.*
,005859	3
,003906	2
,001953	1

TABLE VIII

LONG MEASURE.

1 Mile the Integer.

Yards.	*Decimals.*
1000	,568182
900	,511364
800	,454545
700	,397727
600	,340909

500	,284091
400	,227272
300	,170454
200	,113636
100	,056818
90	,051136
80	,045454
70	,039773
60	,034091
50	,028409
40	,022727
30	,017045
20	,011364
10	,005682
9	,005114
8	,004545
7	,003977
6	,003409
5	,002841
4	,002273
3	,001704
2	,001136
1	,000568

Feet.	*Decimals.*
2	,0003787
1	,0001894

Inch.	*Decimals*
6	,0000947
3	,0000474
1	,0000158

TABLE IX.
TIME.

1 Year the Integer.

Months the ſame as Pence, in the ſecond Table.

Days.	*Decimals.*
365	1,000000
300	,821918
200	,547945
100	,273973
9	,246575
80	,219178
70	,191781
60	,164383
50	,136986
40	,109589
30	,082192
20	,054794
10	,027397
9	,024657
8	,021918
7	,019178
6	,016438
5	,013698
4	,010959
3	,008219
2	,005479
1	,002739

1 Day the Integer

Hours.	*Decimals*
12	,5
11	,458333
10	,416666
9	,375
8	,333333
7	,291666
6	,25
5	,208333
4	,166666
3	,125
2	,083333
1	,041666

Minu.	*Decimals*
30	,020833
20	,013888
10	,006944
9	,00625
8	,005555
7	,004861
6	,004166
5	,003472
4	,002777
3	,002083
2	,001388
1	,000694

TABLE X.
CLOTH MEASURE.

1 Yard the Integer.

Qrs. the ſame as Table 4.

Nails.	*Decimals*
2	,125
1	,0625

TABLE XI.
LEAD WEIGHT.

A Fother the Int.

Hund.	*Decimals.*
10	,512820
9	,461538
8	,410256
7	,358974
6	,307692
5	,256410
4	,205128
3	,153846
2	,102564
1	,051282

Qrs.	*Decimals.*
1	,025641
2	,012820

Pounds.	*Decimals.*
14	,0064102
13	,0059523
12	,0054945
11	,0050366
10	,0045787
9	,0041208
8	,0036630
7	,0032051
6	,0027472
5	,0022893
4	,0018315
3	,0013736
2	,0009157
1	,0004578

he RULE *of* THREE *in* DECIMALS.

EXAMPLES.

IF 26 $\frac{1}{2}$ Yards coſt £3..16..3, what will 32 Yards and a Quarter come to?

Yds. £. *Yds.*
26,5 : 3,8125 : : 32,25 :
32,25

26,5)122,953125(4,63974=£4..12..9 $\frac{2}{2}$

2. What will the Pay of 540 Men come to at £1..5..6 *r* Man? *Anſ.* £688..10 .–.

3. If 7 $\frac{3}{4}$ Yards of Cloth coſt £2..12..9, what will 140 $\frac{1}{2}$ ards of the ſame coſt? *Anſ.* £47..16..3..2, 4 *qrs.*

4. If a Cheſt of Sugar, weighing 7 *cwt.* 2 *qrs.* 14*lb.* coſt 36..12..9, what will 2 *cwt.* 1 *qr.* 21*lb.* of the ſame coſt? *Anſ.* £11..14..2..3, 5 *qrs.*

5. A Grocer buys 24 *Tun.* 12 *cwt.* 2 *qrs.* 14 *lb.* 12 *oz.* of obacco for £3678..6..4, what will 1 *oz.* come to? *Anſ.* 1*d.*

6. What will 326 *lb.* 1 *qr.* of Tobacco come to, when *lb.* $\frac{1}{2}$ is ſold for 3*s.* 6*d.*? *Anſ.* £38..1..3.

7. What is the Worth of 19 *oz.* 3 *dwt.* 5 *gr.* of Gold, at 2..19..– *per oz.*? *Anſ.* £56..10..5 2,2981 *qrs.*

8. What is the Worth of 827 Yards $\frac{3}{4}$ of Painting, at *d.* $\frac{1}{2}$ *per* Yard? *Anſ.* £36. 4..3 1,5 *qrs.*

9. If I lent my Friend £34 for $\frac{5}{8}$ of a Year, how much ught he to lend me $\frac{5}{12}$ of a Year to requite my Kindneſs? *Anſ.* £51.

10. If $\frac{3}{4}$ of a Yard of Cloth, that is 2 Yards one Quar-r broad make a Garment, how much that is $\frac{4}{5}$ of a Yard ide will make the ſame? *Anſ.* 2,109375 *yards.*

11. If 1 Ounce of Silver coſt 5*s.* 6*d.* what is the Price of Tankard that weighs 1 *lb.* 10 *oz.* 10 *dwt.* 4 *grains*? *Anſ.* £6..3. 9. 2,2 *qrs.*

12. If 1 *lb.* of Tobacco coſt 15*d.* what coſt 3 Hogſheads, eighing together 15 *cwt.* 1 *qr.* 19 *lb.*? *Anſ.* £107..18..10,

13. If 1 *cwt.* of Currants coſt £2..9..6, what will 45 *cwt.* *qrs.* 14 *lb.* coſt at the ſame Rate? *Anſ.* £113..10..9. 3 *qrs.*

14. Bought 6 Cheſts of Sugar, each 6 *cwt.* 3 *qrs.* a £2..16..– *per cwt.* what do they come to?
Anſ. 113..8.

15. Bought a Tankard for £10..12..– at the Rate of 5*s.* 4*d. per* Ounce, what was the Weight? *Anſ.* 39 *oz.* 15 *dwt.*

16. Gave £187..3..3 for 25 *cwt.* 3 *qrs.* 14 *lb.* of Tobacco, at what Rate did I buy it at *per lb.*? *Anſ.* 15*d.* 2 *qrs.*

17. Bought 29 *lb.* 4 *oz.* of Coffee for £10..11..3, wha is the Value of 3 *lb.*? *Anſ.* £1..1..8.

18. If I gave 1*s.* 1*d.* for 3 *lb.* ½ of Cheeſe, what will b the Value of 1 *cwt.*? *Anſ.* £1..14..8.

EXTRACTION *of the* SQUARE ROOT

EXtracting the Square Root is to find out ſuch a Num ber as being multiplied into itſelf, the Product wil be equal to the given Number.

RULE *Firſt*, Point the given Number, beginning at th Unit's Place, then to the Hundreds, and ſo upon every ſe cond Figure throughout.

Secondly, Seek the greateſt Square Number in the fir Point towards the Left-hand, placing the Square Numbe under the firſt Point, and the Root thereof in the Quotient ſubtract the Square Number from the firſt Point, and to th Remainder bring down the next Point, and call that th Reſolvend.

Thirdly, Double the Quotient, and place it for a Diviſo on the Left-hand of the Reſolvend; ſeek how often th Diviſor is contained in the Reſolvend (reſerving always th Unit's Place) and put the Anſwer in the Quotient, an alſo on the Right-hand Side of the Diviſor; then multipl by the Figure laſt put in the Quotient, and ſubtract th Product from the Reſolvend, bring down the next Point t the Remainder (if there be any more) and proceed a before.

ROOTS.	1.	2.	3.	4.	5.	6.	7.	8.
SQUARES.	1.	4.	9.	16.	25.	36.	49.	64.

EXAMPLE

EXAMPLES.

1. What is the Square Root of 119025 ? *Anſ.* 345.

```
 •  •  •
 119025(345
 9
 ------
 64)290
    256
 ------
685)3425
    3425
 ------
```

2. What is the Square Root of 106929 ? *Anſ.* 327.
3. What is the Square Root of 2268741 ? *Anſ.* 1506,23+
4. What is the Square Root of 7596796 ? *Anſ.* 2756,228+
5. What is the Square Root of 36372961 ? *Anſ.* 6031.
6. What is the Square Root of 22071204 ? *Anſ.* 4698.

When the given Number conſiſts of a whole Number, nd Decimals together, make the Number of Decimals ven, by adding Cyphers to them, ſo that there may be a Point fall on the Unit's Place of the whole Number.

7. What is the Square Root of 3271,4007 ? *Anſ.* 57,19+
8. What is the Square Root of 4795,25731 ? *Anſ.* 69,247+
9. What is the Square Root of 4,372594 ? *Anſ.* 2,091+
10. What is the Square Root of 2,2710957 ? *Anſ.* 1,50701+
11. What is the Square Root of ,00032754 ? *Anſ.* ,01809+
12. What is the Square Root of 1,270054 ? *Anſ.* 1,1269+

To extract *the* Square Root *of a* VULGAR FRACTION.

RULE. Reduce the Fraction to its loweſt Terms, then xtract the Square Root of the Numerator for a new Numerator, and the Square Root of the Denominator for a new Denominator.

If the Fraction be a Surd (i. e.) *a Number where a Root an never be exactly found, reduce it to a Decimal, and extract the Root from it.*

EXAMPLES.

13. What is the Square Root of $\frac{2304}{5184}$? *Anſ.* $\frac{2}{3}$.
14. What is the Square Root of $\frac{2704}{4225}$? *Anſ.* $\frac{4}{5}$.
15. What is the Square Root of $\frac{9216}{12544}$? *Anſ.* $\frac{6}{7}$.

SURDS.

16. What is the Square Root of $\frac{275}{341}$? *Anſ.* ,89802+
17. What is the Square Root of $\frac{357}{476}$? *Anſ.* ,86602+
18. What is the Square Root of $\frac{478}{549}$? *Anſ.* ,93308+

To extract *the* Square Root *of a* MIX'D NUMBER.

RULE. Reduce the Fractional Part of the mixed Numbe to its loweſt Term, and then the mixed Number to an Improper Fraction.

2dly. Extract the Roots of the Numerator and Denominator for a new Numerator and Denominator.

If the mixed Number given be a Surd, reduce the Fraction Part to a Decimal, annex it to the whole Number, and extra the Square Root therefrom.

EXAMPLES.

19. What is the Square Root of 51 $\frac{21}{25}$? *Anſ.* 7 $\frac{1}{5}$.
20. What is the Square Root of 27 $\frac{9}{16}$? *Anſ.* 5 $\frac{1}{4}$.
21. What is the Square Root of 9 $\frac{43}{49}$? *Anſ.* 3 $\frac{1}{7}$.

SURDS.

22. What is the Square Root of 85 $\frac{14}{15}$? *Anſ.* 9,27+
23. What is the Square Root of 8 $\frac{5}{7}$? *Anſ.* 2,9519+
24. What is the Square Root of 6 $\frac{2}{3}$? *Anſ.* 2,5298+

The APPLICATION.

1. There is an Army conſiſting of a certain Number of Men, who are placed Rank and File, that is, in the Form of a Square, each Side having 576 Men, I deſire to know how many the whole Square contains? *Anſ.* 331776.

2. A certain Pavement is made exactly ſquare, each Side of which contains 97 Feet, I demand how many ſquare Feet are contained therein? *Anſ.* 9409.

To find a mean Proportional between any two given Numbers.

RULE. The Square Root of the Product of the given Numbers is the mean Proportional ſought.

EXAMPLES.

EXAMPLES.

27. What is the mean Proportional between 3 and 12?
Anſ. 3×12=36 *then* √ 36=6 *the mean Proportion.*

28. What is the mean Proportional between 4276, and 42? *Anſ.* 1897,4+

o find the Side of a Square equal in Area to any given Superficies.

RULE. The Square Root of the Content of any given uperficies, is the Square equal ſought.

EXAMPLES.

29. If the Content of a given Circle be 160, what is the ide of the Square? *Anſ.* 12,64911.

30. If the Area of a Circle is 750, what is the ſide of the quare equal? *Anſ.* 27,38612.

The Area of a Circle given to find the Diameter.

RULE. As 355 : 452, or, as 1 : 1,273239 : : ſo is the rea : to the Square of the Diameter;—or, multiply the quare Root of the Area, by 1, 12837, and the Product ill be the Diameter.

EXAMPLE.

31. What Length of Cord will be fit to tie to a Cow's ail, the other End fixed in the Ground, to let her have iberty of eating an Acre of Graſs, and no more, ſuppoſing e Cow and Tail to be 5 Yards ½? *Anſ.* 6, 136 *Perches.*

he Area of a Circle given to find the Periphery, or Circumference,

RULE. As 113 : 1420, or, as 1 : 12,56637 : : the Area to he Square of the Periphery, or multiply the Square Root f the Area by 3,5449, and the Product is the Circumference.

EXAMPLES.

32. When the Area is 12, what is the Circumference? *Anſ.* 12, 2798.

33. When the Area is 160, what is the Periphery? *Anſ.* 44,839.

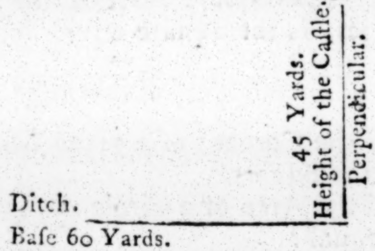
Any two Sides of a right angled Triangle given to find he third Side.

1. The Baſe and Perpendicular given to find the Hypothenuſe.

RULE. The Square Root of the Sum of the Squares of the Baſe and Perpendicular is the Length of the Hypothenuſe.

EXAMPLES.

34. The Top of a Caſtle from the Ground is 45 Yards high, and ſurrounded with a Ditch 60 Yards broad, what Length muſt a Ladder be to reach from the Outſide of the Ditch to the Top of the Caſtle? *Anſ.* 75 *Yards.*



35. The Wall of a Town is 25 Feet high, which is ſurrounded by a Moat of 30 Feet in Breadth, I deſire to kno the Length of a Ladder that will reach from the Outſide o the Moat to the Top of the Wall? *Anſ.* 39,05 *Fee*

The Hypothenuſe and Perpendicular given to find the Baſe.

RULE. The Square Root of the Difference of the Squar of the Hypothenuſe and Perpendicular is the Length of th Baſe.

The Baſe and Hypothenuſe given to find the Perpendicular.

RULE. The Square Root of the Difference of the Squar of the Hypothenuſe and Baſe is the Heighth of the Perpendicular.

N. B. *The two laſt Queſtions may be varied for Exampl the two laſt Propoſitions.*

Any Number of Men being given to form them into ſquare Battle, or to find the Number of Ranks and Files.

RULE. The Square Root of the Number of Men given the Number of Men either in Rank or File.

36. An Army conſiſting of 331776 Men, I deſire to kno how many in Rank and File? *Anſ.* 576.

37. A certain ſquare Pavement contains 48841 ſqu Stones, all of the ſame Size, I demand how many are co tained in one of the Sides? *Anſ.* 221.

EXTRACTION *of the* CUBE ROOT.

TO extract the Cube Root is to find out a Number which being multiplied into itſelf, and then into that Product, produceth the given Number.

RULE 1. Point every third Figure of the Cube given, beginning at the Unit's Place, ſeek the greateſt Cube to the firſt Point, and ſubtract it therefrom, put the Root in the Quotient, and bring down the Figures in the next Point to the Remainder for a *Reſolvend.*

2. Find a DIVISOR by multiplying the Square of the Quotient by 3. See how often it is contained in the Reſolvend, rejecting the Units and Tens, and put the Anſwer in the Quotient.

3. To find the SUBTRAHEND. 1. Cube the laſt Figure in the Quotient. 2. Multiply all the Figures in the Quotient by 3, except the laſt, and that Product by the Square of the laſt. 3. Multiply the Diviſor by the laſt Figure. Add theſe Products together, gives the Subtrahend, which ſubtract from the Reſolvend; to the Remainder bring down the next Point, and Proceed as before.

ROOTS.	1.	2.	3.	4.	5.	6.	7.	8.	9.
CUBES.	1.	8.	27.	64.	125.	216.	343.	512.	729.

EXAMPLES.

1. What is the Cube Root of 99252847?

. . .
99252847(463
64=*Cube of* 4.
Diviſor.
Square of 4×3=48)35252 *Reſolvend.*

216=*Cube of* 6.
432 =4×3× *by Square of* 6.
288 =*Diviſor* × *by* 6.

33336 *Subtrahend.*
Diviſor.
Square of 46×3=6348)1916847 *Reſolvend.*

27=*Cube of* 3.
1242 =46×3× *by Square of* 3.
19044 =*Diviſor* × *by* 3.

1916847 *Subtrahend.*

Another NEW *and more* conciſe Method *of extracting the* Cube Root.

RULE 1. Point every third Figure of the Cube given, beginning at the Unit's Place, then find the nigheſt Cube to the firſt Point, and ſubtract it therefrom, put the Root in the Quotient, bring down the Figures in the next Point to the Remainder for a Reſolvend.

2. Square the Quotient and triple the Square for a Diviſor, *As* 4×4×3=48. Find how often it is contained in the Reſolvend, rejecting Units and Tens, and put the Anſwer in the Quotient.

3. Square the laſt Figure in the Quotient, and put it on the Right Hand of the Diviſor.

As 6×6=36 put to the *Diviſor* 48=4836.

4. Triple the laſt Figure in the Quotient and multiply by the former, put it under the other, Units under the Tens, add them together, and multiply the Sum by the laſt Figure in the Quotient, ſubtract that Product from the Reſolvend, bring down the next Point and proceed as before.

EXAMPLES.

1. What is the Cube Root of 99252847 ?

Square of 4×3=48 *Diviſor.*	99252847(463
Square of 6, *put to* 48=4836	64
6×3×4= 72	
	35252
5556×6=	33336
Square of 46=2116×3=6348 *Diviſor*	
Square of 3=9 *put to* 6348=*634809	1916847
3×3×46=414	
638949×3=1916847	

2. What is the Cube Root of 389017 ? *Anſ.* 73.
3. What is the Cube Root of 5735339 ? *Anſ.* 179.
4. What is the Cube Root of 32461759? *Anſ.* 319.
5. What is the Cube Root of 84604519? *Anſ.* 439.
6. What is the Cube Root of 259694072? *Anſ.* 638.
7. What is the Cube Root of 48228544 ? *Anſ.* 364.

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* *When the Quotient is 2 or 3 there muſt be a* Cypher *put to ſupply the Place of Tens.*

8. What is the Cube Root of 27054036008? *Anſ.* 3002.
9. What is the Cube Root of 22069810125? *Anſ.* 2805.
10. What is the Cube Root of 122615327232? *Anſ.* 4968.
11. What is the Cube Root of 219365327791? *Anſ.* 6031.
12. What is the Cube Root of 673373097125? *Anſ.* 8765.

1. *When the given Number conſiſts of a whole Number and Decimal together, make the Number of Decimals to conſiſt of* 3, 6, 9, &c. *Places by adding Cyphers thereto, ſo that there may be a Point fall on the Unit's Place of the whole Number.*

13. What is the Cube Root of 12,977875? – *Anſ.* 2,35
14. What is the Cube Root of 36155,027576? *Anſ.* 33,06+
15. What is the Cube Root of ,001906624? – *Anſ.* ,124.
16. What is the Cube Root of 33,230979637? *Anſ.* 3,215+
17. What is the Cube Root of 15926,972504? *Anſ.* 25,16+
18. What is the Cube Root of ,053258279? – *Anſ.* ,376

To extract the Cube Root of a Vulgar Fraction.

RULE. Reduce the Fraction to its loweſt Terms, then extract the Cube Root of the Numerator and Denominator for a new Numerator and Denominator, but if the Fraction be a Surd, reduce it to a Decimal, and then extract the Root from it.

EXAMPLES.

19. What is the Cube Root of $\frac{250}{686}$? *Anſ.* $\frac{5}{7}$.
20. What is the Cube Root of $\frac{324}{1500}$? *Anſ.* $\frac{3}{5}$.
21. What is the Cube Root of $\frac{1520}{5130}$? *Anſ.* $\frac{2}{3}$.

SURDS..

22. What is the Cube Root of $\frac{4}{7}$? *Anſ.* ,829+
23. What is the Cube Root of $\frac{5}{9}$? *Anſ.* ,822+
24. What is the Cube Root of $\frac{2}{3}$? *Anſ.* ,873+

To extract the Cube Root of a mixt Number.

RULE. Reduce the Fractional Part to its loweſt Terms, and then the mixt Number to an improper Fraction, extract the Cube Roots of the Numerator and Denominator for a new Numerator and Denominator; but, if the mixt Number given be a Surd, reduce the Fractional Part to a Decimal, annex it to the whole Number, and extract the Root therefrom.

EXAMPLES.

EXAMPLES.

25. What is the Cube Root of $12\frac{19}{27}$? *Anſ.* $2\frac{1}{3}$.
26. What is the Cube Root of $31\frac{15}{343}$? *Anſ.* $3\frac{1}{7}$.
27. What is the Cube Root of $405\frac{28}{125}$? *Anſ.* $7\frac{2}{5}$.

SURDS.

28. What is the Cube Root of $7\frac{1}{5}$? *Anſ.* 1,93+
29. What is the Cube Root of $9\frac{1}{6}$? *Anſ.* 2,092+
30. What is the Cube Root of $8\frac{5}{7}$? *Anſ.* 2,057+

The APPLICATION.

1. If a cubical Piece of Timber be 47 Inches long, 47 Inches broad, and 47 Inches deep, how many cubical Inches doth it contain? *Anſ.* 103823.

2. There is a Cellar dug, that is 12 Feet every Way in Length, Breadth, and Depth, how many ſolid Feet of Earth was taken out of it? *Anſ.* 1728.

3. There is a Stone of a Cubic Form, which contains 389017 ſolid Feet, what is the ſuperficial Content of One of its Sides? *Anſ.* 5329.

Between two Numbers given, to find two mean Proportionals.

RULE. Divide the greater Extream by the leſs, and the Cube Root of the Quotient multiplied by the leſs Extream, gives the leſs Mean; multiply the ſaid Cube Root by the leſſer Mean, and the Product will be the greater Mean proportional.

EXAMPLES.

4. What are the two mean Proportionals between 6 and 162? *Anſ.* 18 *and* 54.

5. What are the two mean Proportionals between 4 and 108? *Anſ.* 12 *and* 36.

To find the Side of a Cube that ſhall be equal in Solidity to any given Solid, as a Globe, Cylinder, Priſm, Cone, &c.

RULE. The Cube Root of the ſolid Content of any ſolid Body given, is the Side of the Cube of equal Solidity.

EXAMPLE.

6. If the ſolid Content of a Globe is 10648, what is the Side of a Cube of equal Solidity? *Anſ.* 22.

The Side of the Cube being given, to find the Side of the Cube, that ſhall be double, treble, &c. in Quantity to the Cube given.

RULE. Cube the Side given, and multiply it by 2, 3, *&c.* the Cube Root of the Product is the Side ſought.

EXAMPLE.

7. There is a cubical Veſſel, whoſe Side is 12 Inches, and it is required to find the Side of another Veſſel, that is to contain 3 Times as much? *Anſ.* 17,306.

EXTRACTION *of the* BIQUADRATE ROOT.

TO extract the Biquadrate Root, is to find out a Number, which being involved four Times into itſelf will produce the given Number.

RULE. Firſt extract the Square Root of the given Number, and then extract the Square Root of that Square Root, and it will give the Biquadrate Root required.

EXAMPLES.

1. What is the Biquadrate of 27? - - *Anſ.* 531441.
2. What is the Biquadrate of 76? - - *Anſ.* 33362176.
3. What is the Biquadrate of 275? - - *Anſ.* 5719140625.
4. What is the Biquadrate Root of 531441? - - *Anſ.* 27.
5. What is the Biquadrate Root of 33362176? - *Anſ.* 76.
6. What is the Biquadrate Root of 5719140625? *Anſ.* 275.

A general RULE *for* EXTRACTING *the* ROOTS *of all* POWERS.

1. PREPARE the Number given for Extraction, by pointing off from the Units Place, as the Root required directs.

2. Find the firſt Figure in the Root, by the Table of Powers, which ſubtract from the given Number.

3. Bring down the firſt Figure in the next Point to the Remainder, and call it the Dividend.

4. Involve the Root into the next inferior Power to that which is given, multiply it by the given Power, and call it the Diviſor.

5. Find

5. Find a Quotient Figure by common Diviſion, and annex it to the Root, then involve the whole Root into the given Power, and call that the Subtrahend.

6. Subtract *that Number* from as many Points of the given Power as is brought down, beginning at the loweſt Place, and to the Remainder bring down the firſt Figure of the next Point for a new Dividend.

7. Find a new Diviſor, and proceed in all Reſpects as before.

EXAMPLES.

1. What is the Square Root of 141376?

· · ·
141376(376
9

6)51 *Dividend*

1369 *Subtrahend*

74) 447 *Dividend*

141376 *Subtrahend*

3 × 2 = 6 *Diviſor.*
37 × 37 = 1369 *Subtrahend.*
37 × 2 = 74 *Diviſor.*
376 × 376 = 141376 *Subtrahend.*

2. What is the Cube Root of 53157376?

· · ·
53157376(376
27

27)261 *Dividend*

50653 *Subtrahend*

4107)25043 *Dividend*

53157376 *Subtrahend*

3 × 3 × 3 = 27 *Diviſor*
37 × 37 × 37 = 50653 *Subtrahend*
37 × 37 × 3 = 4107 *Diviſor*
376 × 376 × 376 = 53157376 *Subtrahend.*

3. Wha

3. What is the Biquadrate Root of 19987173376?

19987173376(376
81

108)1188 *Dividend*

1874161 *Subtrahend*

202612)124556 *Dividend*

19987173376 *Subtrahend*

3× 3× 3× 4= 108 *Diviſor*
37× 37× 37× 37= 1874161 *Subtrahend*
37× 37× 37× 4= 202612 *Diviſor*
376×376×376×376= 19987173376 *Subtrahend*

SIMPLE INTEREST.

THERE are five letters to be obſerved in Simple Intereſt, *viz.*

P. the Principal.
T. the Time.
R. the Ratio, or Rate *per Cent.*
I. the Intereſt.
A. the Amount.

A TABLE *of* RATIOS.

3	,03	5½	,055	8	,08
3½	,035	6	,06	8½	,085
4	,04	6½	,065	9	,09
4½	,045	7	,07	9½	,095
5	,05	7½	,075	10	,1

Note, *The* Ratio *is the Simple Intereſt of* £1, *for one Year,* *the* Rate per Cent. *propoſed, and is found thus:*

£. £. £.
As 100 : 3 : : 1 : ,03 *As* 100 : 3,5 : : 1 : ,035.

When the Principal, Time and Rate per Cent. *are given to find the Intereſt.*

RULE. Multiply the Principal, Time and Rate together, and it will give the Intereſt required.

Note, *The Propoſition and Rule are better expreſſed thus:*

1. When P, T, and R are given to find I.

RULE. $prt = I$.

Note, *When two or more Letters are put together like a Word, they are to be multiplied one into another.*

EXAMPLES.

1. What is the Intereſt of £945..10..– for 3 Years, at 5 *per Cent. per Annum?*

Anſ. £945,5 × ,05 × 3 = 141 ,825 *or* £141..16..6.

2. What is the Intereſt of £547..14..– at 4 *per Cent. per Annum*, for 6 Years? *Anſ.* £131..8..11. 2 *qr.* ,08.

3. What is the Intereſt of £796 .15..– at 4 ½ *per Cent. per Annum* for 5 Years? *Anſ.* £179..5..4. 2 *qr.*

4. What is the Intereſt of £397..9..5 for 2 Years and at 3 ½ *per Cent. per Annum?* *Anſ.* £34 .15..6. 3,5499 *qrs.*

5. What is the Intereſt of £554..17..6 for 3 Years, 8 Months, at 4 ½ *per Cent. per Annum?* *Anſ.* £91..11..0. 2,01969

6. What is the Intereſt of £236..18..8 for 3 Years 8 Months, at 5 ½ *per Cent. per Annum?*

Anſ. £47..15..7. 1,4528 *qrs.*

When the Intereſt is for any Number of Days only.

RULE. Multiply the Intereſt of £1 for one Day, at the given Rate, by the Principal and Number of Days, it will give the Anſwer.

INTEREST *of* £1 *for* 1 DAY.

per Cent.	*Decimals.*	*per Cent.*	*Decimals.*
3	,00008219178	6½	,00017808219
3½	,00009589041	7	,00019178082
4	,00010958904	7½	,00020547945
4½	,00012328767	8	,00021917808
5	,00013698630	8½	,00023287671
5½	,00015068493	9	,00024657534
6	,00016438356	9½	,00026027397

Note, *The above Table is thus found.*

As 365 : ,03 : : 1 : ,00008119178. *And as* 365 : ,035 :: 1 ,00009589041, *&c.*

EXAMPLES.

7. What is the Intereſt of £240 for 120 Days, at 4 *per Cent. per Ann?* *Anſ.* ,00010958904 × 240 × 120 = £3..3..1 $\frac{1}{4}$.

8. What is the Intereſt of £563 at 6 *per Cent. per Annum,* for 126 Days? *Anſ.* £11..13..2 $\frac{1}{2}$.

9. What is the Intereſt of £560 for 60 Days, at 5 *per Cent. per Annum?* *Anſ.* £4..12..– $\frac{1}{2}$.

10. What is the Intereſt of £364. 18..– for 154 Days, at 5 *per Cent. per Annum?* *Anſ.* £7..13..11 $\frac{1}{4}$.

11. What is the Intereſt of £725..15..– for 74 Days, at 4 *per Cent. per Annum?* *Anſ.* £5..17..8 $\frac{1}{4}$.

12. What is the Intereſt of £100 from the 1ſt of *June*, 1770, to the 9th of *March* following, at 5 *per Cent. per Annum?* *Anſ.* £3..16..11 $\frac{3}{4}$

II. *When* P, R, T *are given to find* A.

RULE. $prt. + p = a$.

EXAMPLES.

13. What will £279..12..– amount to in 7 Years, at 4 $\frac{1}{2}$ *per Cent. per Annum?* *Anſ.* £367..13..5. 3,04 *qrs.* 279,6 × ,045 × 7 + 279,6 = 367,674.

14. What will £320..17..– amount to in 5 Years, at 3 $\frac{1}{2}$ *per Cent. per Annum?* *Anſ.* £376..19..11. 2, 8 *qrs.*

15. What will £679..13..–. amount to in 6 Years, at 5 *per Cent. per Annum?* *Anſ.* £883..10..10. 3, 2 *qrs.*

When there is any odd Time given with the whole Years, reduce the odd Time into Days, and work with the Decimal Parts of a Year which are equal to thoſe Days.

16. What will £926..12..– amount to in 5 Years $\frac{1}{2}$, at 4 *per Cent. per Annum?* *Anſ.* £1130..9..–. 1,92 *qrs.*

17. What will £368..16..– amount to in 7 Years $\frac{3}{4}$, at 6 $\frac{1}{2}$ *per Cent. per Annum?* *Anſ.* £554..11..7. 3,68 *qrs.*

18. What will £273..18..– amount to in 4 Years, 175 Days, at 3 *per Cent. per Annum?*
Anſ. £310..14..1. 3,35080064 *qrs.*

III. *When* A, R, T *are given to find* P.

RULE. $$\frac{a}{rt+1} = P.$$

EXAMPLES.

19. What Principal being put to Intereſt, will amount to £367..13..5. 3,04 *qrs.* in 7 Years, at $4\frac{1}{2}$ *per Cent. per Annum?* *Anſ.* ,045×7×1=1,315, *then* 367,674÷1,315= £279..12..–.

20. What Principal being put to Intereſt, will amount to £376..19..11. 2,8 in 5 Years, at $3\frac{1}{2}$ *per Cent. per Annum?* *Anſ.* £320..17..–.

21. What Principal being put to Intereſt will amount to £883..10..10. 3,2 *qrs.* in 6 Years, at 5 *per Cent. per Annum?* *Anſ.* £679–..13..–.

22. What Principal being put to Intereſt will amount to £1130..9..–. 1,92 *qrs.* in 5 Years $\frac{1}{2}$, at 4 *per Cent. per Annum?* *Anſ.* £926..12..–.

23. What Principal will amount to £554..11..7. 3,68 *qrs.* in 7 Years $\frac{3}{4}$, at $6\frac{1}{2}$ *per Cent. per Annum?* *Anſ.* £368..16..–.

24. What Principal will amount to £310..14..1.3,3508006 *qrs.* in 4 Years, 175 Days, at 3 *per Cent. per Annum?* *Anſ.* £273..18..–.

IV. *When* A, P, T *are given to find* R.

RULE. $$\frac{a-p}{pt.}=R$$

EXAMPLES.

25. At what Rate *per Cent.* will £279..12..– amount to £367..13..5. 3,04 *qrs.* in 7 Years?

Anſ. 367,674—279,6=88,074. 279,6×7=1957,2 *then* £88,074÷1957,2=,045 *or* $4\frac{1}{2}$ *per Cent.*

26. At what Rate *per Cent.* will £320..17..– amount to £376..19..11. 2,8 *qrs.* in 5 Years? *Anſ.* $3\frac{1}{2}$ *per Cent.*

27. At what Rate *per Cent.* will £679..13..– amount to £883.10..10. 3,2 *qr.* in 6 Years? *Anſ.* 5 *per Cent.*

28. At what Rate *per Cent,* will £926..12..– amount to £1130..9..–. 1,92 *qrs.* in 5 Years $\frac{1}{2}$? *Anſ.* 4 *per Cent.*

29. At what Rate *per Cent.* will £368..16..– amount to £554..11..7. 3,68 *qrs.* in 7 Years $\frac{3}{4}$? *Anſ.* $6\frac{1}{2}$ *per Cent.*

30. At what Rate *per Cent.* will £273..18..– amount to £310..14..1. 3,35080064 *qrs.* in 4 Years, 175 Days? *Anſ.* 3 *per Cent.*

V. *When* A, P, R *are given to find* T.

RULE, $$\frac{a-p}{pr.}=T$$

31. In what Time will £279..12..– amount to £367..13..5.
3,04 *qrs.* at 4 ½ *per Cent?* *Anſ.* 367,674—279,6=88,074.
279,6×,045=12,5820 *then* 88,074÷12,5820 = 7 *Years.*

32. In what Time will £320..17..– amount to £376..19..11
2,8 *qrs.* at 3 ½ *per Cent.?* *Anſ.* 5 *Years.*

33. In what Time will £679..13..– amount to £883..10..10
3,2 *qrs.* at 5 *per Cent. per Annum?* *Anſ.* 6 *Years.*

34. In what Time will £926..12..– amount to £1130..9..–
1,92 *qrs.* at 4 *per Cent. per Annum?* *Anſ.* 5 *Years* ½.

35. In what Time will £368..16..– amount to £554..11..7
3,68 *qrs.* at 6 ½ *per Cent.?* *Anſ.* 7 *Years* ¾.

36. In what Time will 273..18..– amount to £310..14..1
3,35080064 *qrs.* at 3 *per Cent.?* *Anſ.* 4 Years, 175 *Days.*

Annuities, *or* Penſions, *&c. in* Arrears.

Annuities, or Penſions, *&c.* are ſaid to be in Arrears, when they are payable or due, either yearly, half yearly, or quarterly, and are unpaid for any Number of Payments.

NOTE. U *repreſents the* Annuity, Penſion, *or* yearly Rent. T, R, A, *as before.*

I. *When* U, R, T *are given to find* A.

RULE. $\frac{ttu - tu}{2} \times r : + tu = A$

EXAMPLES.

37. If a Salary of £150 be forborne 5 Years, at 5 *per Cent.* what would it amount to? *Anſ.* £825.

$\overline{5\times5\times150}-\overline{5\times150}=3000.$ *then* $\frac{3000}{2}\times{,}05+5\times150=$ £825

38. If £250 yearly Penſion be forborne 7 Years, what will it amount to in that Time, at 6 *per Cent.* *Anſ.* £2065.

39. There is a Houſe let upon Leaſe for 5 Years ½, at £60 *per Annum* what will be the amount of the whole Time, at 4 ½ *per Cent.?* *Anſ.* £363..8..3.

40. Suppoſe an annual Penſion of £28 remains unpaid for 8 Years, what would it amount to at 5 *per Cent.?*
Anſ. £263..4..–

Note, *When the Annuities,* &c. *are to be paid half yearly, or quarterly, then*

For half yearly Payments, *take Half of the Ratio, Half of the Annuity,* &c. *and twice the Number of Years,—and,*

For Quarterly Payments, *take a fourth Part of the Ratio, a fourth Part of the Annuity,* &c. *and four Times the Number of Years, and work as before.*

EXAMPLES.

41. If a Salary of £150 payable every half Year, remains unpaid for 5 Years, what would it amount to in that Time, at 5 *per Cent. per Annum?* *Anſ.* £834..7..6.

42. If a Salary of £150 payable every Quarter, was left unpaid for 5 Years, what would it amount to in that Time, at 5 *per Cent.?* *Anſ.* £839..1..3

Note, *It may be obſerv'd, by comparing theſe laſt Examples, that the Amount of the half yearly Payments are more advantageous than the yearly, and the quarterly more than the half yearly.*

II. *When* A, R, T *are given to find* U.

RULE. $$\frac{2a}{ttr-tr+2t}=U.$$

EXAMPLES.

43. If a Salary amounted to £825 in 5 Years, at 5 *per Cent.* what was the Salary? *Anſ.* £150.

$825\times2=1650.\ \overline{5\times5\times,05}-\overline{5\times,05}+\overline{5\times2}=11$ *then* $1650\div11=$£150.

44. If a Houſe to be let upon a Leaſe for 5 Years $\frac{1}{2}$, and the Amount for that Time be £363..8..3 at 4 $\frac{1}{2}$ *per Cent.* what is the yearly Rent? *Anſ.* £60.

45. If a Penſion amounted to £2065 in 7 Years at 6 *per Cent.* what was the Penſion? *Anſ.* £250.

46. Suppoſe the Amount of a Penſion be £263..4..– in 8 Years at 5 *per Cent.* what is the Penſion? *Anſ.* £28.

Note, *When the Payments are half yearly, then take 4a and half of the Ratio, and twice the Number of Years; and if quarterly, then take 8a, one fourth of the Ratio, and four Times the Number of Years, and proceed as before.*

47. If the Amount of a Salary payable half yearly for 5 Years, and at 5 *per Cent.* be £834..7..6 what is the Salary? *Anſ.* £150.

48. If the Amount of an Annuity payable quarterly be £839..1..3 for 5 Years, at 5 *per Cent.* what is the Annuity? *Anſ.* £150.

III. *When* U, A, T *are given to find* R.

RULE. $\frac{2a-2ut}{utt-ut}=R$

EXAMPLES.

49. If a Salary of £150 *per Annum*, amounts to £825 in 5 Years, what is the Rate *per Cent?* *Anſ.* 5 *per Cent.*

$\overline{825\times2}-\overline{150\times5\times2}=150$ *then* $\frac{150}{\overline{150\times5\times5}-\overline{150\times5}}=,05$

50. If an Houſe be let upon Leaſe for 5 Years ½ at £60 *per Annum*, and the Amount for that Time be £363..8..3 what is the Rate *per Cent?* *Anſ.* 4 ½ *per Cent.*

51. If a Penſion of £250 *per Annum*, amounts to £2065 in 7 Years, what is the Rate *per Cent?* *Anſ.* 6 *per Cent.*

52. Suppoſe the Amount of a yearly Penſion of £28 be £263..4..- in 8 Years, what is the Rate *per Cent?* *Anſ.* 5 *per Cent.*

Note, *When the Payments are half yearly, take* 4a—4ut *for a Dividend, and work with half the Annuity, and double the Number of Years for a Diviſor; if quarterly, take* 8a—8ut *and work with a Fourth of the Annuity, and four Times the Number of Years.*

53. If a Salary of £150 *per Annum*, payable half yearly, amounts to £834..7..6 in 5 Years, what is the Rate *per Cent?* *Anſ.* 5 *per Cent.*

54. If an Annuity of £150 *per Annum*, payable quarterly, amounts to £839..1..3 in 5 Years, what is the Rate *per Cent?* *Anſ.* 5 *per Cent.*

IV. *When* U, A, R *are given to find* T.

RULE. *Firſt* $\frac{2}{r}-1=x$ *then* $\sqrt{\frac{2a}{ur}+\frac{xx}{4}}:-\frac{x}{2}=T.$

EXAMPLES.

55. In what Time will a Salary of £150 *per Annum*, amount to £825 at 5 *per Cent?* *Anſ.* 5 *Years.*

$$\frac{2}{,05} - 1 = 39 \quad \frac{825\times 2}{150\times ,05} = 220 \quad \frac{39\times 39}{4} = 380,25$$

$$\sqrt{220+380,25} = 24,5 - \frac{39}{2} = 5 \text{ Years.}$$

56. If an Houſe is let upon Leaſe for a certain Time for £60 *per Annum*, and the Amount be £363..8..3 at 4 ½ *per Cent.* I deſire to know the Time it was let for?

Anſ. 5 ½ *Years.*

57. If a Penſion of £250 ***per Annum*** being forborne a certain Time, amounts to £2065 at 6 *per Cent.* what was the Time of Forbearance? *Anſ.* 7 *Years.*

58. In what Time will a yearly Penſion of £28 amount to £263..4..– at 5 *per Cent.?* *Anſ.* 8 *Years.*

Note, *If the Payments are half yearly, take half the Ratio, and half the Annnity; if quarterly, one Fourth of the Ratio, and one Fourth of the Annuity, and T will be equal to thoſe half yearly or quarterly Payments.*

59. If an Annuity of £150 ***per Annum***, payable half-yearly, amounts to £834..7..6 at 5 *per Cent.* what Time was the Payment forborne? *Anſ.* 5 *Years.*

60. If a yearly Penſion of £150 payable quarterly, amounts to £839..1..3 at 5 *per Cent.* what was the Time of Forbearance? *Anſ.* 5 *Years.*

Preſent Worth of ANNUITIES.

Note, P *repreſents the preſent Worth*; U, T, R *as before.*

I. *When* U, T, R *are given to find* P.

$$\text{RULE.}\quad \frac{ttr - tr + 2t}{2tr + 2} : \times u = P.$$

EXAMPLES.

61. What is the preſent Worth of £150 *per Annum*, to continue 5 Years, at 5 *per Cent.* *Anſ.* £660.

$5\times5\times,05 - 5\times,05 + 5\times2 = 11.\quad 5\times,05\times2 + 2 = 2,5$ *then* $11 \div 2,5 \times 150 =$ £660.

62. What is the yearly Rent of a Houſe of £60 to continue 5 ½ Years worth in ready Money, at 4 ½ *per Cent.?*

Anſ. £291..6..3.

63. What is the preſent Worth of £250 *per Annum*, to continue 7 Years at 6 *per Cent.?* *Anſ.* £1454..4..6.

64. What is a Penſion of £28 ***per Annum*** worth in ready Money at 5 *per Cent.* for 8 Years? *Anſ.* £188.

Note, *The ſame Thing is to be obſerved here as in the firſt Rule of Annuities in Arrears, concerning half yearly and quarterly Payments.*

65. What is the preſent Worth of £150 payable half yearly for 5 Years, at 5 *per Cent.* *Anſ.* £667..10..–.

66. What is the preſent Worth of £150 payable quarterly for 5 Years, at 5 *per Cent?* *Anſ.* £671..5..–.

Note, *By comparing the laſt Examples it will be found that the preſent Worth of half yearly Payments is more advantageous than yearly; and quarterly, than half yearly.*

II. *When* P, T, R *are given to find* U.

$$\text{RULE } \frac{tr+1}{ttr-tr+2t} : \times 2p = \text{U}.$$

EXAMPLES.

67. If the preſent Worth of a Salary be £660, to continue 5 Years at 5 *per Cent.* what was the Salary? *Anſ.* £150.

$$\overline{5\times,05}+1=1.25.\quad \overline{5\times5\times,05}-\overline{5\times,05}+10=11$$

$$\text{then } \frac{1,25}{11}\times660\times2=150.$$

68. There is an Houſe let upon Leaſe for 5 ½ Years to come, I deſire to know the yearly Rent, when the preſent Worth at 4 ½ *per Cent.* is £291..6..3? *Anſ.* £60.

69. What Annnuity is that which for 7 Years Continuance at 6 *per Cent.* produce £1454..4..6 preſent Worth? *Anſ.* £250.

70. What Annuity is that which for 8 Years Continuance produces £188 for the preſent Worth, at 5 *per Cent.* *Anſ.* £28.

Note, *When the Payments are half yearly, take Half the Ratio, twice the Number of Years, and multiply by* 4p, *and when quarterly take one fourth of the Ratio, four Times the Number of Years, and multiply by* 8p.

71. There is an Annuity payable half yearly, for 5 Years to come, what is the yearly Rent, when the preſent Worth at 5 *per Cent.* is £667..10..–? *Anſ.* £150.

72. There is an Annuity payable quarterly, for 5 Years to come, I deſire to know the yearly Income, when the preſent Worth at 5 *per Cent.* is £671..5..–? *Anſ.* £150.

III. *When* U, P, T *are given to find* R.

$$\text{RULE. } \frac{\overline{ut-p}\times 2}{2pt+ut-utt} = \text{R}.$$

EXAMPLES.

73. At what Rate *per Cent.* will an Annuity of £150 *per Annum*, to continue 5 Years, produce the preſent Worth of £660? *Anſ.* 5 *per Cent.*

$$\overline{150\times5-660\times2}=180.2\times\overline{\overline{660\times5}+\overline{150\times5}-\overline{150\times5\times5}}$$

$=3600$ *then* $180\div3600=,05=5$ *per Cent.*

74. If a yearly Rent of £60 *per Annum* to continue 5½ Years, produce £291..6..3 for the preſent Worth, what is the Rate *per Cent.* *Anſ.* 4 ½ *per Cent.*

75. If an Annuity of £250 *per Annum*, to continue 7 Years, produce £1454..4..6 for the preſent Worth, what is the Rate *per Cent.* *Anſ.* 6 *per Cent.*

76. If a Penſion of £28 *per Annum*, to continue 8 Years, produce £188 for the preſent Worth, what is the Rate *per Cent.* *Anſ.* 5 *per Cent*

Note, *When the Annuities or Rents*, &c. *are to be paid half yearly, or quarterly, then*

For half yearly Payments, *take half of the Annuity*, &c. *and twice the Number of Years, the Quotient will be the Ratio of a fourth Part of the Rate per Cent. and*

For quarterly Payments, *take a fourth Part of the Annuity*, &c. *and four Times the Number of Years, the Quotient will be the Ratio of a fourth Part of the Rate* per Cent.

77. An Annuity of £150 *per Annum*, payable half yearly, having 5 years to come, is ſold for £667..10..– what is the Rate *per Cent* ? *Anſ.* 5 *per Cent.*

78. If an Annuity of £150 *per Annum*, payable quarterly, having 5 Years to come, is ſold for £671..5..– what is the Rate *per Cent.* ? *Anſ.* 5 *per Cent.*

IV. *When* U, P, R *are given to find* T.

RULE. $\overline{\frac{2}{r}-\frac{2p}{u}}-1=x$ *then* $\sqrt{\overline{\frac{2p}{ur}+\frac{xx}{4}}}-\frac{x}{2}=$

EXAMPLES.

79. If an Annuity of £150 *per Annum*, *produce* £660 fo the preſent Worth, at 5 *per Cent.* what is the Time of i Continuance? *Anſ.* 5 *Years.*

$$\frac{2}{,05} - \frac{660\times2}{150} - 1 = 30,2 \qquad \frac{660\times2}{150\times,05} = 176 -$$

$$\frac{30,2\times30,2}{4} = 228,01 \text{ then } \sqrt{228,01+176} = 20,1$$

$$20,1 - \frac{30,2}{2} = 5 \text{ Years}$$

80. For what Time may a Salary of £60 be purchaſed for £291..6..3, at $4\frac{1}{2}$ *per cent.?* *Anſ.* $5\frac{1}{2}$ *Years.*

81. For how long Time may £250 *per Annum* be purchaſed for £1454..4..6, at 6 *per cent.?* *Anſ.* 7 *Years.*

82. What Time may a Penſion of £28 *per Annum* be bought for £188 at 5 *per cent.?* *Anſ.* 8 *Years.*

Note, *When the Payments are half yearly, then* U *will be equal to the Half Annuity,* &c. R, *Half the Ratio, and* T *the Number of Payments; and*

When the Payments are quarterly, U *will be equal to a fourth Part of the Annuity,* &c. R, *the fourth of the Ratio, and* T *the Number of Payments.*

83. If an Annuity of £150 *per Annum,* payable half yearly, is ſold for £667..10..– at 5 *per cent.* I deſire to know the Number of Payments, and the Time to come?

Anſ. 10 *Payments,* 5 *Years.*

84. An Annuity of £150 *per Annum,* payable quarterly is ſold for £671..5..– at 5 *per cent.* what is the Number of Payments and Time to come? *Anſ.* 20 *Payments,* 5 *Years.*

ANNUITIES, *&c. taken in* REVERSION.

1. *To find the preſent Worth of Annuity,* &c. *taken in Reverſion.*

RULE. Find the preſent Worth of the yearly Sum at the given Rate, and for the Time of its Continuance, *thus,*

$$\frac{ttr - tr + 2t}{2tr + 2} : \times u = P.$$

2. Change *P.* into *A.* and find what Principal being put to Intereſt will amount to *A,* at the ſame Rate, and for the Time to come before the Annuity, *&c.* commences, thus,

$$\frac{a}{tr \times 1} = P.$$

EXAM-

EXAMPLES.

85. What is the preſent worth of an Annuity of £150 *per Annum*, to continue 5 Years, but not to commence till the End of 4 Years, allowing 5 *per Cent.* to the Purchaſer?

Anſ. £550.

$$\frac{\overline{\overline{\overline{5\times5}\times,05}-\overline{5\times,05}+\overline{2\times5}}}{5\times05\times2+2}=4,4\times150=\frac{660}{4\times,05+1}=550$$

86. What is the preſent Worth of a Leaſe of £50 *per Annum*, to continue 4 Years, but is not to commence till the End of 5 Years, allowing 4 *per Cent.* to the Purchaſer?

Anſ. £152..5..11. 3 *qrs.*

87. A Perſon having the Promiſe of a Penſion of £20 *per Annum*, for 8 Years, but is not to commence till the End of 4 Years, is willing to diſpoſe of the ſame for preſent Money at 5 *per Cent.* what will be the preſent Worth?

Anſ. £111..18..1. 14+*d.*

88. A Legacy of £40 being left for 6 Years to a Perſon of 15 Years of Age, but is not to commence till he is 21. He wanting Money, is deſirous of ſelling the ſame at 4 *per Cent.* what is the preſent Worth? *Anſ.* 171..14..–

II. *To find the yearly Income of an Annuity,* &c. *in Reverſion.*

RULE 1. Find the Amount of the preſent Worth at the given Rate, and for the Time before the Reverſion, *thus,*

$$ptr+p=A$$

2. Change *A.* into *P.* and find what Annuity being ſold will produce *P.* at the ſame Rate, and for the Time of its Continuance, *thus,*

$$\frac{tr+1}{ttr-tr+2t}:\times2p=U.$$

EXAMPLES.

89. A Perſon having an Annuity left him for 5 Years, which does not commence till the End of 4 Years, has diſpoſed of it for the preſent Payment of £550 allowing 5 *per Cent.* to the Purchaſer, what was the yearly Income?

Anſ. £150.

$$\overline{550\times4\times,05}+550=660\ \frac{5\times,05+1.}{\overline{\overline{\overline{5\times5}\times,05}-\overline{5\times,05}+\overline{5\times}}}$$
$$=,113630\times660\times2=£150.$$

90. There is a Leaſe of an Houſe taken for 4 Years, but not to commence till the End of 5 Years, the Leſſee would ſell the ſame for £152..6..– preſent Payment, allowing 4 *per Cent.* to the Purchaſer, what is the yearly Rent? *Anſ.* £50.

91. A Perſon having the Promiſe of a Penſion for 8 Years, which does not commence till the End of 4 Years, has diſpoſed of the ſame for £111..18..1 ,14 preſent Money, allowing 5 *per Cent.* to the Purchaſer, what was the Penſion? *Anſ.* £20.

92. There is a certain Legacy left to a Perſon of 15 Years of Age, which is to be continued for 6 Years, but not to commence till he arrives to the Age of 21; he wanting a Sum of Money, ſells it for £171..14..– allowing 4 *per Cent.* to the Buyer, what was the Annuity left him? *Anſ.* £40.

REBATE *or* DISCOUNT.

Note, S *Repreſents the Sum to be diſcounted.*
P *the preſent Worth.*
T *the Time.*
R *the Ratio.*

I. *When* S, T, R *are given to find* P.

RULE. $\frac{s.}{tr.+1}=$P.

EXAMPLES.

1. What is the preſent Worth of £357..10..– to be paid 9 Months hence at 5 *per Cent.*? *Anſ.* £344..11..6. 3,168 *qrs.*

$$\frac{357{,}5}{{,}75\times{,}05+1}=344{,}5783$$

2. What is the preſent Worth of £275..10..– due 7 Months hence, at 5 *per Cent.*? *Anſ.* £267..13..10. 164*d.*

3. What is the preſent Worth of £875..5..6 due 5 Months hence, at 4 ½ *per Cent.*? *Anſ.* £859..3..3. 3,2544+ *qrs.*

4. How much ready Money can I receive for a Note of £75 due 15 Months hence, at 5 *per Cent*? *Anſ.* £70..11..9. ,1752*d.*

II. *When* P, T, R, *are given to find* S.

RULE. $ptr+p=S$.

EXAMPLES.

5. If the preſent Worth of a Sum of Money due 9 Months hence, allowing 5 *per Cent.* to be £344..11..6. 3,168 *qrs.* what was the Sum firſt due? *Anſ.* £357..10..-.

$$344{,}5783\times{,}75\times{,}05+344{,}5783=£357..10..-.$$

6. A Perſon owing a certain Sum payable 7 Months hence agrees with the Creditor to pay him down £267..13..10. 164*d.* allowing 5 *per Cent.* for preſent Payment, what is the Debt? *Anſ.* £275..10..-.

7. A Perſon receives £859..3..3. 3,2544 *qrs.* for a Sum of Money due 5 Months hence, allowing the Debtor $4\frac{1}{2}$ *per Cent.* for preſent Payment, what was the Sum due? *Anſ.* £875..5..6.

8. A Perſon paid £70..11..9. ,1752 for a Debt due 15 Months hence, he being allowed 5 *per Cent.* for the Diſcount, how much was the Debt? *Anſ.* £75.

III. *When* S, P, T *are given to find* R

RULE. $\frac{s-p}{tp}=R$

EXAMPLES.

1. At what Rate *per Cent.* will £357..10..- payable Months hence, produce £344..11..6. 3,168 *qrs.* for preſen Payment?

$$\frac{357{,}5-344{,}5783}{344{,}5783\times{,}75}={,}05=5\ per\ Cent.$$

10. At what Rate *per Cent.* will £275..10..- payable Months hence, produce £267..13..10. ,164*d.* for preſent Payment? *Anſ.* 5 *per Cent.*

11. At what Rate *per Cent.* will £875..5..6 payable Months hence, produce the preſent Payment of £859 ..3 ..3 3,2544 *qrs.*? *Anſ.* $4\frac{1}{2}$ *per Cent.*

12. At what Rate *per Cent.* will £75 payable 15 Month hence, produce the preſent Payment of £70..11..9 ,175 *Anſ.* 5 *per Cent*

[illegible]

[illegible] 3] [illegible]

IV.

IV. *When* S, P, R *are given to find* T.

RULE. $\frac{s-p}{rp} = T$.

EXAMPLES.

13. The preſent worth of £357..10..– due for a certain Time to come, is £344..11..6. 3,168 *qrs.* at 5 *per Cent.* in what Time ſhould the Sum have been paid without any Rebate?

Anſ. $\frac{357,5-344,5783}{344,5783 \times ,05} = ,75 = 9$ *Months.*

14. The preſent Worth of £275..10..0 due for a certain Time to come, is £267..13..10. ,164*d.* at 5 *per Cent.* what Time ſhould the Sum have been paid without any Rebate?

Anſ. 7 *Months.*

15. A Perſon receives £859..3..3. 3,2544 *qrs.* for £875..5..6 due at a certain Time to come, allowing 4 $\frac{1}{2}$ *per Cent.* Diſcount; I deſire to know in what Time the Debt ſhould have been diſcharged without any Rebate?

Anſ. 5 *Months.*

16. I have received £70..11..9. ,1752*d.* for a Debt of £75 allowing the Perſon 5 *per Cent.* for prompt Payment, I deſire to know when the Debt would have been payable without the Rebate? *Anſ.* 15 *Months.*

EQUATION *of* PAYMENTS.

To find the equated Time for the Payment of a Sum of Money due at ſeveral Times.

RULE. Find the preſent Worth of each Payment for its reſpective Time, Add all the preſent Worths together, *thus* $\frac{s}{tr+1} = P$.

then $s-p = D$.

and $\frac{d}{pr} = E$.

Examples.

1. *D* owes *E* £200, whereof £40 is to be paid at 3 Months, £60 at 6 Months, and £100 at 9 Months, at what Time may the whole Debt be paid together, Rebate being made at 5 *per Cent.*? *Anſ.* 6 *Months*, 26 *Days.*

$$\frac{40}{1,0125}=39,5061. \quad \frac{60}{1,025}=58,5365 \quad \frac{100}{1,0375}=96,3855$$

then $200-39,5061+58,5365+96,3855=5,5719$

$$\frac{5,5719}{194,4281\times,05}=,57315$$ = 6 *Months*, 26 *Days.*

2. *D* owes *E* £800 whereof £200 is to be paid in 3 Months, £200 at 4 Months, and £400 at 6 Months; but they agreeing to make but one Payment of the Whole, at the Rate of 5 *per Cent.* Rebate, the true equated Time i demanded? *Anſ.* 4 *Months*, 22 *Days.*

3. *E* owes *F* £1200 which is to be paid as follows: £200 down, 500 at the End of 10 Months, and the reſ at the End of 20 Months; but they agreeing to have bu one Payment of the whole; Rebate at 3 *per Cent.* the tru equated Time is demanded? *Anſ.* 1 *Year*, 11 *Days.*

COMPOUND INTEREST.

THE Letters made Uſe of in Compound Intereſt are,

A the Amount,
P the Principal,
T the Time,
R the Amount of £1 for 1 Year, at any give Rate; which is thus found.

As 100 : 105 : : 1 : 1,05. As 100 : 105,5 : : 1 : 1,055

A TABLE of the Amount of £1 for 1 Year.

Rates per Cent.	*Amts. of £1.*	*Rates per Cent.*	*Amts. of £1.*	*Rates per Cent.*	*Amts. of £1*
3	1,03	$5\frac{1}{2}$	1,055	8	1,08
$3\frac{1}{2}$	1,035	6	1,06	$8\frac{1}{2}$	1,085
4	1,04	$6\frac{1}{2}$	1,065	9	1,09
$4\frac{1}{2}$	1,045	7	1,07	$9\frac{1}{2}$	1,095
5	1,05	$7\frac{1}{2}$	1,075	10	1,1

A TABLE ſhewing the Amount of £1 for any Number of Years under 31, at 5 and 6 *per Cent. per Annum.*

Years.	5 Rates	6	*Years.*	5 Rates	6
1	1,05000	1,06000	16	2,18287	2,54035
2	1,10250	1,12360	17	2,29201	2,69277
3	1,15762	1,19101	18	2,40662	2,85434
4	1,21550	1,26247	19	2,52695	3,02559
5	1,27628	1,33822	20	2,65329	3,20713
6	1,34009	1,41852	21	2,78596	3,39956
7	1,40710	1,50363	22	2,92526	3,60353
8	1,47745	1,59384	23	3,07152	3,81975
9	1,55132	1,68948	24	3,22510	4,04893
10	1,62889	1,79084	25	3,38635	4,29187
11	1,71034	1,89829	26	3,55567	4,54938
12	1,79585	2,01219	27	3,73345	4,82234
13	1,88565	2,13292	28	3,92013	5,11168
14	1,97993	2,26090	29	4 11613	5,41838
15	2,07892	2,39655	30	4,32194	5,74349

Note, *The above Table is thus made:* As 100 : 105 : : 1. ,05 *for the firſt Year*; *then*, As 100 : 105 : : 1,05 : 1,1025 *d Year*, &c.

I. *When* P, T, R *are given to find* A.

RULE, $p \times r^t = A$.

EXAMPLES.

1. What will £225 amount to in 3 Years Time, at 5 *per Cent. per Annum?* *Anſ.* 1,05×1,05×1,05=1,157625 *then* ,157625×225=£260..9..3. 3 *qrs.*

2. What will £200 amount to in 4 Years, at 5 *per Cent. er Annum?* *Anſ.* £243. 2,025 *s.*

3. What will £450 amount to in 5 Years, at 4 *per Cent. r Annum?* *Anſ.* £547..9..10. 2,0538368 *qrs.*

4. What will £500 amount to in 4 Years, at 5 ½ *per Cent. r Annum?* *Anſ.* £619..8..2. 3,8323 *qrs.*

II. *When* A, R, T *are given to find* P.

RULE. $\frac{a}{r^t} = P$.

EXAMPLES.

5. What Principal being put to Intereſt will amount to £260..9..3.. 3 *qrs.* in 3 Years, at 5 *per Cent. per Annum?*

$$1{,}05 \times 1{,}05 \times 1{,}05 = 1{,}157625. \qquad \frac{260{,}465625}{1{,}157625} = £225.$$

6. What Principal being put to Intereſt will amount to £243..2,025*s.* in 5 Years, at 4 *per Cent. per Annum?* *Anſ.* £200.

7. What Principal will amount to £547..9..10.2,0538368 *qrs.* in 5 Years, at 4 *per Cent. per Annum?* *Anſ.* £450.

8. What Principal will amount to £619..8..2.3,8323 *qrs.* in 4 Years, at 5 ½ *per Cent?* *Anſ.* £500.

III. *When* P, A, T *are given to find* R.

RULE. $\frac{a}{p} = r^t$ *which being extracted by the Rule of Extraction, (the Time given to the Queſtion ſhewing the Power will give* R.

EXAMPLES.

9. At what Rate *per Cent.* will £225 amount to £260..9..3, 3 *qrs.* in 3 Years?

Anſ. $\frac{260{,}465625}{225} = 1{,}157625$ *(the Cube Root of which (it being the third Power)* $= 1{,}05 =$ 5 *per Cent.*

10. At what Rate *per Cent.* will £200 amount to £243. 2,025*s.* in 4 Years? *Anſ.* 5 *per Cent.*

11. At what Rate *per Cent.* will £450 amount to £547 9.10. 2,0538368 *qrs.* in 5 Years? *Anſ.* 4 *per Cent.*

12. At what Rate *per Cent.* will £500 amount to £619 8. 2. 3,8323 *qrs.* in 4 Years? *Anſ.* 5 ½ *per Cent.*

IV. *When* P, A, R *are given to find* T.

RULE. $\frac{a}{p} = r^t$. *which being continually divided by* R, *till nothing remains, the Number of thoſe Diviſions will be equal to* T.

EXAMPLES.

EXAMPLES.

13. In what Time will £225 amount to £260..9..3. 3 *qrs.* at 5 *per Cent.?*

$$\frac{260,465625}{225}=1,157625\frac{1,157625}{1,05}=1,1025\frac{1,1025}{1,05}=1,05\frac{1,05}{1,05}$$

= 1. *The Number of Diviſions being* 3 = *Time ſought.*

14. In what Time will £200 amount to £243..2,025*s.* at 5 *per Cent.?* *Anſ.* 4 *Years.*

15. In what Time will £450 amount to £547..9..10. 2,0538368 *qrs.* at 4 *per Cent.?* *Anſ.* 5 *Years.*

16. In what Time will £500 amount to £619..8..2 ,38323 *qrs.* at 5 ½ *per Cent.?* *Anſ.* 4 *Years.*

ANNUITIES, *or* PENSIONS *in* ARREARS.

Note, U *repreſents the Annuity, Penſion, or yearly Rent,* A, R, T *as before.*

A TABLE ſhewing the Amount of £1 Annuity for any Number of Years under 31, at 5 and 6 *per Cent. per Ann.*

Years.	5 *Rates*	6	*Years.*	5 *Rates*	6
1	1,00000	1,00000	16	23,65749	25,67252
2	2,05000	2,06000	17	25,84036	28,21288
3	3,15250	3,18360	18	28,13238	30,90565
4	4,31012	4,37461	19	30,53900	33,75999
5	5,52563	5,63709	20	33,06595	36,78559
6	6,80191	6,97532	21	35,71925	39,99272
7	8,14200	8,39383	22	38,50521	43,39229
8	9,54910	9,89746	23	41,43047	46,99582
9	11,02656	11,49131	24	44,50199	50,81557
10	12,57789	13,18079	25	47,72709	54,8645
11	14,20678	14,97164	26	51,11345	59,15638
12	15,91712	16,86994	27	54,66912	63,70576
13	17,71298	18,88213	28	58,40258	68,52811
14	19,59863	21,01506	29	62,32271	73,63979
15	21,57856	23,27597	30	66,43884	79,05818

Note, *The above Table is made thus, take the firſt Year's Amount, which is* £1, *multiply it by* 1,05 + 1 = 2,05 = 2*d Year's Amount, which alſo multiply by* 1,05 + 1 = 3,1525, = 3*d Year's Amount.*

I. *When* U, T, R, *are given to find* A.

RULE. $\frac{ur^t+u}{r-1}=A$, *or by the Table thus,*

Multiply the Amount of £1 for the Number of Years, and at the Rate *per Cent.* given in the Queſtion, by the Annuity, Penſion, *&c.* and it will give the Anſwer.

EXAMPLES.

17. What will an Annuity of £50 *per Annum,* payable yearly, amount to in 4 Years, at 5 *per Cent.?*

Anſ. $1,05\times1,05\times1,05\times1,05\times50=60,77531250$

then $\frac{60,7753125-50}{1,05-1}=$ £215..10..1 2 *qrs. or by the Table.*

thus, 4,31012×50=£215..10..1. 1,76 *qrs.*

18. What will a Penſion of £45 *per Annum,* payable yearly, amount to in 5 Years, at 5 *per Cent.?*

Anſ. £248..13..0. 3,27 *qrs.*

19. If a Salary of £40 *per Annum* to be paid yearly, be forborne 6 Years, at 6 *per Cent.* what is the Amount?

Anſ. £279..–.. 3,072 *d.*

20. If an Annuity of £75 *per Annum,* payable yearly, be omitted to be paid for 10 Years, at 6 *per Cent.* what is the Amount? *Anſ.* £988..11. 2,22*d.*

II. *When* A, T, R *are given to find* U.

RULE. $\frac{ar-a}{r^t-1}=U$.

EXAMPLES.

21. What Annuity being forborne 4 Years, will amount to £215..10..1. 2 *qrs.* at 5 *per Cent.?*

Anſ. $\frac{215,50625\times1,05-215,50625}{1,05\times1,05\times1,05\times1,05-1.}=$ £50.

22. What Penſion being forborne 5 Years will amount to £248..13..0. 3,27 *qrs.* at 5 *per Cent.?* *Anſ.* £45.

23. What Salary being omitted to be paid 6 Years, will amount to £279..–..3,072*d.* at 6 *per Cent.?* *Anſ.* £40.

24. If the Payment of an Annuity being forborne 10 Years amount to £988..11..2,22*d.* at 6 *per Cent.* what is the Annuity? *Anſ.* £75.

III. *When* U, A, R *are given to find* T.

RULE. $\frac{ar+u-a}{u}=r^t$. *which being continually divided by* R, *till nothing remains, the Number of thoſe Diviſions will be equal to* T.

EXAMPLES.

25. In what Time will £50 *per Annum* amount to £215..10..1. 2 *qrs.* at 5 *per Cent.* for Non-payment?

Anſ. $\frac{215,50625\times1,05+50-215,50625}{50}=1,21550625.$

which being continually divided by R, *the Number of thoſe Diviſions will be* = 4 *Years.*

26. In what Time will £45 *per Annum* amount to £248..13..–. 3,27 *qrs.* allowing 5 *per Cent.* for Forbearance of Payment? *Anſ.* 5 *Years.*

27. In what Time will £40 *per Annum* amount to £279..–..3,072, at 6 *per Cent.?* *Anſ.* 6 *Years.*

28. In what Time will £75 *per Annum* amount to £988..11..2,22 *d.* allowing 6 *per Cent.* for Forbearance of Payment? *Anſ.* 10 *Years.*

PRESENT WORTH *of* ANNUITIES, PENSIONS, *&c.*

A TABLE ſhewing the preſent Worth of £1 Annuity for any Number of Years under 31, Rebate at 5 and 6 *per Cent.*

Years.	5 *Rates*	6	*Years.*	5 *Rates*	6
1	0,95238	0,94339	16	10,83777	10,10589
2	1,85941	1,83339	17	11,27406	10,47726
3	2,72324	2,67301	18	11,68958	10,82760
4	3,54595	3,46510	19	12,08532	11,15811
5	4,32947	4,21236	20	12,46221	11,46992
6	5,07569	4,91732	21	12,82115	11,76407
7	5,78637	5,58238	22	13,16300	12,04158
8	6,46321	6,20979	23	13,48857	12,30338
9	7,10782	6,80169	24	13,79864	12,55035
10	7,72173	7,36008	25	14,09394	12,78335
11	8,30641	7,88687	26	14,37518	13,00316
12	8,86325	8,38384	27	14,64303	13,21053
13	9,39357	8,85268	28	14,89812	13,40616
14	9,89864	9,29498	29	15,14107	13,59072
15	10,37965	9,71225	30	15,37245	13,76483

Note, *The above Table is thus made, divide £1 by* 1,05 = ,95238 *the preſent Worth of the firſt Year, which* ÷ 1,05 = ,90703 *added to the firſt Year's preſent Worth* = 1,85941 *the ſecond Year's preſent Worth, then,* 90703 ÷ 1,05 *and the Quotient added to* 1,85941 = 2,72324 *the third Year's preſent Worth,* &c.

I. *When* U, T, R *are given to find* P.

RULE. $$\frac{u - \frac{u}{r^t}}{r-1} = P.$$

or, by the Table thus,

Multiply the preſent Worth of £1 Annuity for the Time and Rate *per Cent* given, by the Annuity, Penſion, *&c.* it will give the Anſwer.

EXAMPLES.

EXAMPLES.

29. What is the preſent Worth of an Annuity of £30 *per Annum*, to continue 7 Years, at 6 *per Cent.?* *Anſ.* £167..9..–. 5,184*d.*

$$\frac{30}{1,50363}=19,9517.\quad 30-19,9517=10,0483.\ \frac{10,0483}{1,06-1}$$

$=167,4716.$ *By the Table* $5,58238\times30=167,4714.$

30. What is the preſent Worth of a Penſion of £40 *per Annum*, to continue 8 Years, at 5 *per Cent?* *Anſ.* £258..10. 6. 3,264 *qrs.*

31. What is the preſent Worth of a Salary of £35 to continue 7 Years, at 6 *per Cent.?* *Anſ.* £195..7..7. 3,968 *qrs.*

32. What is the yearly Rent of £50, to continue 5 Years, worth in ready Money, at 5 *per Cent.?*
Anſ £216..9..5. 2,56 *qrs.*

II. *When* P, T, R *are given to find* U.

RULE. $$\frac{\overline{pr^t\times r-pr^t}}{r^t-1}=U.$$

EXAMPLES.

33. If an Annuity be purchaſed for £167..9..5, 184*d.* to be continued 7 Years, at 6 *per Cent.* what is the Annuity?

Anſ. $$\frac{\overline{167,4716\times1,50363\times1,06-107,4716\times1,50363}}{1,50363-1}=£30$$

34. If the preſent Payment of £258..10..6. 3,264 *qrs.* be made for a Salary 8 Years to come, at 5 *per Cent.* what was the Salary? *Anſ.* £40.

35. If the preſent Payment of £195..7..7. 3,968 *qrs.* were required for a Penſion for 7 Years to come, at 6 *per Cent.* what is the Penſion? *Anſ.* £35.

36. If the preſent Worth of an Annuity, 5 Years to come, be £216..9..5. 2,56 *qrs.* at 5 *per Cent.* what is that Annuity? *Anſ.* £50.

III. *When* U, P, R *are given to find* T.

RULE. $\frac{u}{p+u-pr}=r^t$ *which being continually divided by* R *till nothing remains, the Number of thoſe Diviſions will be equal to* T.

EXAMPLES.

37. How long will a Leaſe of £30 yearly Rent be had for £167..9..5. 184*d.* allowing 6 *per Cent.* to the Purchaſer?

Anſ. $\frac{30}{167{,}4716\times30-177{,}5198}=1{,}50363$ *which being continually divided, the Number of thoſe Diviſions will be* = *to* T. = 7 *Years.*

38. If 258..10..6. 3,264 *qrs.* is paid down for a Leaſe of £40 *per Annum*, at 5 *per Cent.* how long is the Leaſe purchaſed for? *Anſ.* 8 *Years.*

39. If an Houſe is let upon Leaſe for £35 *per Annum*, and the Leſſee makes preſent Payment of £195..7..8, he being allowed 6 *per Cent.* I demand how long the Leaſe is purchaſed for? *Anſ.* 7 *Years.*

40. For what Time may a Leaſe of £50 *per Annum*, be purchaſed, when preſent Payment is made of £216..9..5. 2,56 *qrs.* at 5 *per Cent.*? *Anſ.* 5 *Years.*

ANNUITIES, LEASES, *&c. taken in* REVERSION.

To find the preſent Worth of Annuities, Leaſes, &c. *taken in Reverſion.*

RULE. 1. Find the preſent Worth of the Annuity, *&c.* at the given Rate and for the Time of its Continuance; *thus,*

$$\frac{u-\frac{u}{r^t}}{r-1}=\text{P.}$$

Change P into A, and find what Principal being put to Intereſt will amount to P at the ſame Rate, and for the Time to come, before the Annuity commences, which will be the preſent Worth of the Annuity, *&c. thus.*

$$\frac{a}{r^t}=\text{P.}$$

EXAMPLES.

41. What is the preſent Worth of a Reverſion of a Leaſe of £40 *per Annum*, to continue 6 Years, but not to commence till the End of two Years, allowing 6 *per Cent.* to the Purchaſer? *Anſ.* £175..1..1. 2,048 *qrs.*

$$\frac{40}{1,41852}=28,1984: \quad \frac{40-28,1984}{1,06-1}=196,6933 \quad \frac{196,6933}{1,1236}$$

$$=175,0563$$

42. What is the preſent Worth of a Reverſion of a Leaſe of £60 *per Annum*, to continue 7 Years, but not to commence till the End of 3 Years, allowing 5 *per Cent.* to the Purchaſer? *Anſ.* £299..18. 2,4*d.*

43. There is a Leaſe of a Houſe £30 *per Annum*, which is yet in being for 4 Years, and the Leſſee is deſirous to take a Leaſe in Reverſion for 7 Years, to begin when the old Leaſe ſhall be expired, what will be the preſent Worth of the ſaid Leaſe in Reverſion, allowing 5 *per Cent.* to the Purchaſer? *Anſ.* £142..16..3. 2,688 *qrs.*

To find the yearly Income of an Annuity, &c. taken in Reverſion.

RULE. Find the Amount of the preſent Worth, at the given Rate, and for the Time before the Annuity commences; *thus,*

$$pr^t = A$$

Change A into P, and find what yearly Rent being ſold, will produce P, at the ſame Rate, and for the Time of its Continuance, which will be the yearly Sum required. *thus,*

$$\frac{pr^t \times r - pr^t}{r^t - 1} = U.$$

EXAMPLES.

44. What Annuity to be entered upon 2 Years hence, and then to continue 6 Years, may be purchaſed for £175..1..1. 2,048 *qrs.* at 6 *per Cent.*?

Anſ. $175,0563 \times 1,1236 = 196,6933$

then $$\frac{\overset{P}{196,6933} \times 1,41852 \times 1,06 - 279,01337}{1,41852 - 1} = £40$$

P

2. The

45. The preſent Worth of a Leaſe of an Houſe is £299..18..2,4*d.* taken in Reverſion for 7 Years, but not to commence till the End of 3 Years, allowing 5 *per Cent.* to the Purchaſer, what is the yearly Rent? *Anſ.* £60.

46. There is a Leaſe of a Houſe in being for 4 Years, and the Leſſee being minded to take a Leaſe in Reverſion for 7 Years, to begin when the old Leaſe ſhall be expired, paid down £142..16..3. 2,688 *qrs.* what was the yearly Rent of the Houſe, when the Leſſee was allowed 5 *per Cent.* for preſent Payment? *Anſ.* £30.

PURCHASING FREEHOLD *or* REAL ESTATES,

Is ſuch as is bought to continue for ever.

When U, R *are given to find* W.

RULE. $\frac{u}{r-1}=$W.

EXAMPLES.

47. What is the Worth of a Freehold Eſtate of £50 pe *Annum*, allowing 5 *per Cent.* to the Buyer?

Anſ. $\frac{50}{1,05-1}=$£1000.

48. What is an Eſtate of £140 *per Annum*, to contin for ever, worth in preſent Money, allowing 4 *per Cent.* t the Buyer? *Anſ.* £3500.

49. If a Freehold Eſtate of £75 yearly Rent were to b ſold, what is it worth, allowing the Buyer 6 *per Cent.*? *Anſ.* £1250.

II. *When* W, R *are given to find* U.

RULE. $w\times\overline{r-1}=$U.

EXAMPLES.

50. If a Freehold Eſtate is bought for £1000 and the Al lowance of 5 *per Cent.* is made to the Buyer, what is th yearly Rent? *Anſ.* 1,05.—1=,05. *then* 1000×05=£5

51. If an Eſtate be ſold for £3500, and 4 *per Cent.* a lowed to the Buyer, what is the yearly Rent? *Anſ.* £14

52. If a Freehold Eſtate is bought for £1250 preſent M ney, and an Allowance of 6 *per Cent.* made to the Buy for the ſame, what is the yearly Rent? *Anſ.* £75

III. *When* W, U, *are given to find* R.

RULE. $\frac{w+u}{w}=$R.

EXAMPLES.

53. If an Eſtate of £50 *per Annum* is bought for £1000, what is the Rate *per Cent.?*

Anſ. $\frac{1000+50}{1000}=1{,}05=5$ *per Cent.*

54. If a Freehold Eſtate of £140 *per Annum* be bought for £3500, what was the Rate *per Cent.* allowed? *Anſ.* 4 *per Cent.*

55. If an Eſtate of £75 *per Annum* is ſold for £1250, what is the Rate *per Cent.* allowed? *Anſ.* 6 *per Cent.*

Purchaſing FREEHOLD ESTATES *in* REVERSION.

To find the Worth of a Freehold Eſtate in Reverſion.

RULE. Find the Worth of the yearly Rent, *thus*, $\frac{u}{r-1}=W$. Change W into A, and find what Principal being put to Intereſt, will amount to A at the ſame Rate, and for the Time to come, before the Eſtate commences, and that will be the Worth of the Eſtate in Reverſion *thus*, $\frac{a}{r^t}=P$.

EXAMPLES.

56. If a Freehold Eſtate of £50 *per Annum*, to commence 4 Years hence, is to be ſold, what is it worth, allowing the Purchaſer 5 *per Cent.* for preſent Payment?

Anſ. $\frac{50}{1{,}05-1}=1000$. *then*, $\frac{1000}{1{,}2155}=$ £822..14..1. 2 *qrs.* +

57. What is an Eſtate of £200 to continue for ever, but not to commence till the End of 2 Years, worth in ready Money, allowing the Purchaſer 4 *per Cent.?*

Anſ. £4622,.15*s.* 7*d.* 44 *qrs.*

58. What is an Eſtate of £240 *per Annum*, worth in ready Money, to continue for ever, but not to commence till the End of 3 Years, Allowance being made at 6 *per Cent.?*

Anſ. £3358 .9..10. 2,24 *qrs.*

To find the yearly Rent of an Eſtate taken in Reverſion.

RULE. Find the Amount of the Worth of the Eſtate, at the given Rate and Time before it commences, *thus*, $wr^t=A$.

Change A into W, and find what yearly Rent being ſold will produce U, at the ſame Rate, *thus*, $\frac{wr\times r-wr}{r}=U$. which will be the yearly Rent required.

EXAMPLES.

59. If a Freehold Eſtate, to commence 4 Years hence, is ſold for £822..14..1. 2 *qrs.* allowing the Purchaſer 5 *per Cent.* what is the yearly Income ?

Anſ. $822,7067 \times 1,2155 = 1000.$

then $\dfrac{1000 \times 1,05 \times 1.05 - 1050}{1,05} = £50.$

60. A Freehold Eſtate is bought for £4622..15. 7,44*d.* which does not commence till the End of 2 Years, the Buyer being allowed 4 *per Cent* for his Money, I deſire to know the yearly Income ? *Anſ.* £200.

61. There is a Freehold Eſtate ſold for £3358..9..10. 2,24 *qrs.* but not to commence till the Expiration of 3 Years, allowing 6 *per Cent.* for preſent Payment, what is the Yearly Income ? *Anſ.* £240.

REBATE *or* DISCOUNT.

A TABLE ſhewing the Preſent Worth of £1 due at any Number of Years, to commence under 31, Rebate at 5 and 6 *per Cent.*

Years.	5 *Rates*	6	*Years.*	5 *Rates*	6
1	,952381	,943396	16	,458111	,393647
2	,907030	,889996	17	,436296	,371364
3	,863838	,839619	18	,415520	,350343
4	,822702	,792093	19	,395734	,330513
5	,783526	,747258	20	,376889	,311804
6	,746215	,704960	21	,358942	,294155
7	,710682	,665057	22	,341849	,277505
8	,676839	,627412	23	,325571	,261797
9	,644609	,591898	24	,310067	,246978
10	,613913	,558394	25	,295302	,232998
11	,584679	,526787	26	,281240	,219810
12	,556837	,496969	27	,267848	,207368
13	,530321	,468839	28	,255093	,195630
14	,505068	,442301	29	,242946	,184556
15	,481017	,417265	30	,231377	,174110

Note, *The above Table is made thus :* 1 ÷ 1,05 = 95238 *firſt Year's preſent Worth, and* ,952381 ÷ 1,05 = ,90703 *ſecond Year, and* ,90703 ÷ 1,05 = ,863838 *third Year,* &c.

7. *Wh*

I. *When* S, T, R *are given to find* P.

RULE. $\frac{s}{r^t}=P$

EXAMPLES.

1. What is the preſent Worth of £315 .. 12 .. 4. 2 *qrs.* payable 4 Years hence at 6 *per Cent.?*

Anſ. 1,06 × 1,06 × 1,06 × 1,06 = 1,26247.. *then, by the Table.*

$$\frac{315,6175}{1,26247}=250. \qquad \begin{array}{r} 315,6175 \\ ,792093 \\ \hline 249,9984124275 \end{array}$$

2. If £344..14..9. 1,92 *qrs.* be payable in 7 Years Time, what is the preſent Worth, Rebate being made at 5 *per Cent.?* *Anſ.* £245.

3. There is a Debt of £441..17..3. 1,92 *qrs.* which is payable 4 Years hence, but it is agreed to be paid in preſent Money, what Sum muſt the Creditor receive, Rebate being made at 6 *per Cent.?* *Anſ.* £350.

II. *When* P, T, R *are given to find* S.

RULE. $p \times r^t = S$

EXAMPLES.

4. If a Sum of Money due 4 Years hence produce £250 for the preſent Payment, Rebate being made at 6 *per Cent.* what was the Sum firſt due?

Anſ. 250 × 1,26247 = £315..12. 4. 2*d.*

5. If £245 be received for a Debt payable 7 Years hence, nd an Allowance of 5 *per Cent.* to the Debtor for preſent Payment, what was the Debt? *Anſ.* £344..14..9. 1,92 *qrs.*

6. There is a Sum of Money due at the Expiration of 4 Years, but the Creditor agrees to take £350 for preſent Payment, allowing 6 *per Cent.* what was the Debt?

Anſ. £441..17..3. 1,92 *qrs.*

III. *When* S, P, R *are given to find* T.

RULE. $\frac{s}{p}=r^t$. *which being continually divided by* R, *till nothing remains, the Number of thoſe Diviſions will be equal to* T.

EXAMPLES.

7. The preſent Payment of £250 is made for a Debt of £315..12..4. ,2*d.* Rebate at 6 *per Cent.* in what Time was the Debt payable?

Anſ. $\frac{315,6175}{250}=1,26247$ *which being continually divided, thoſe Diviſions will be equal to* $4=$ *the Number of Years.*

8. A Perſon receives £245 now for a Debt of £344..14..9. 1,92 *qrs.* Rebate being made at 5 *per Cent.* I demand in what Time the Debt was payable? *Anſ.* 7 *Years.*

9. There is a Debt of £441..17..3. 1,92 *qrs.* due at a certain Time to come, but 6 *per Cent.* being allowed to the Debtor for the preſent Payment of £350, I deſire to know in what Time the Sum ſhould have been made without any Rebate? *Anſ.* 4 *Years.*

IV. *When* S, P, T *are given to find* R.

RULE. $\frac{s}{p}=r^t$ *which being extracted by the Rules of Extraction, (the Time given in the Queſtion, ſhewing the Power,) will be equal to* R.

EXAMPLES.

10. A Debt of £315..12..4. 2*d.* is due 4 Years hence, but it is agreed to take £250 now, what is the Rate *per Cent.* that the Rebate is made at?

Anſ. $\frac{315,6175}{250}=1,26247\ ;\ \sqrt[4]{1,26247}=1,06=6$ *per Cent.*

11. The preſent Worth of £344..14..9. 1,92 *qrs.* payable 7 Years hence, is £245, at what Rate *per Cent.* is Rebate made? *Anſ.* 5 *per Cent.*

12. There is a Debt of £441..17..3. 1,92 *qrs.* payable in 4 Years Time, but it is agreed to take £350 preſent Payment, I deſire to know at what Rate *per Cent.* Rebate is made at? *Anſ.* 6 *per Cent.*

THE

TUTOR's ASSISTANT.

PART IV.

DUODECIMALS:

Or, what is generally called *Croſs Multiplication*, and *Squaring of Dimenſions by Artificers and Workmen.*

RULES *for multiplying* DUODECIMALLY.

1. UNDER the Multiplicand write the correſponding Denominations of the Multiplier.

2. Multiply each Term in the Multiplicand (beginning at the loweſt) by the Feet in the Multiplier; write each Reſult under its reſpective Term, obſerving to carry an Unit for every 12, from each lower Denomination to its next Superior.

3. In the ſame Manner multiply the Multiplicand by the Primes in the Multiplier, and write the Reſult of each Term one Place more to the Right-hand of thoſe in the Multiplicand.

4. Work in the ſame Manner with the Seconds in the Multiplier, ſetting the Reſult of each Term two Places to the Right-hand of thoſe in the Multiplicand, and ſo on for Thirds, Fourths, *&c.*

EXAMPLES.

f. in. *f. in.*
1. Multiply 7 . 9 by 3 . 6

Croſs Multiplication.	*Practice.*	*Duodecimals.*	*Decimals.*
7 × 9	6 ½ 7 . 9	7 . 9	7,75
3 6	3 . 6	3 . 6	3,5
21 . – . – = 7×3	23 . 3	23 . 3 . ×3	3875
2 . 3 . – = 9×3	3 . 10 . 6	3 . 10 . 6×6	2325
3 . 6 . – = 7×6			
– . 4 . 6 = 9×6	27 . 1 . 6	27 . 1 . 6	27,125
27 . 1 . 6			

		f.	*in.*		*f.*	*in.*		*f.*	*in.*
2.	Multiply	8.	5.	by	4.	7.	*Facit*	38.	6.11
3.	Multiply	9.	8.	by	7.	6.	*Facit*	72.	6.
4.	Multiply	8.	1.	by	3.	5.	*Facit*	27.	7. 5
5.	Multiply	7.	6.	by	5.	9.	*Facit*	43.	1. 6
6.	Multiply	4.	7.	by	3.	10.	*Facit*	17.	$6.10^{\prime\prime\prime\,\prime\prime\prime\prime}$
7.	Multiply	7.	$5.9^{\prime\prime}$	by	3.	$5.3^{\prime\prime}$	*Facit*	25.	8. 6.2.3
8.	Multiply	10.	4.5	by	7.	8.6	*Facit*	79.	11. 0.6.6
9.	Multiply	75.	7.	by	9.	8.	*Facit*	730.	7. 8.
10.	Multiply	97.	8.	by	8.	9.	*Facit*	854.	7.
11.	Multiply	57.	9.	by	9.	5.	*Facit*	543.	9. 9.
12.	Multiply	75.	9.	by	17.	7.	*Facit*	1331.	11. 3.
13.	Multiply	87.	5.	by	35.	8.	*Facit*	3117.	10. 4.
14.	Multiply	179.	3.	by	38.	10.	*Facit*	6960.	10. 6.
15.	Multiply	259.	2.	by	48.	11.	*Facit*	12677.	6.10.
16.	Multiply	257.	9.	by	39.	11.	*Facit*	10288.	$6.\,.\,3^{\prime\prime\prime\,\prime\prime\prime\prime}$
17.	Multiply	311.	4.7.	by	36.	7.5.	*Facit*	11402.	2.4 11.11
18.	Multiply	321.	7.3.	by	9.	3.6.	*Facit*	2988.	2.10.4 6.

The APPLICATION.

Artificers' Work is computed by different Meaſures, *viz.*

1. *Glazing* and *Maſons Flat-work* by the Foot.
2. *Painting*, *Plaiſtering*, *Paving*, &c. by the Yard.
3. *Partitioning*, *Flooring Roofing*, *Tyling*, &c. by the Square 100 Feet.
4. *Brick-work*, &c. by the Rod of 16 Feet ½ whoſe Square is 272 ¼.

MEASURING *by the* FOOT SQUARE, *as* GLAZIERS *and* MASONS *Flat-work.*

EXAMPLES.

19. There is a Houſe with 3 Tier of Windows, 3 in a Tier, the Height of the firſt Tier 7 Feet 10 Inches, the ſecond 6 Feet 8 Inches, and the third 5 Feet 4 Inches, the Breadth of each is 3 Feet 11 Inches, what will the Glazing come to at 14*d.* *per* Foot?

Duodecimals.
7 . 10 *the*
6 . 8 *Heights*
5 . 4 *added*
19 . 10
3 = *Windows*
59 . 6 *in a Tier.*
3 . 11. *in Breadth.*
178 . 6
54 . 6 . 6
233 . — . 6

feet. *in.* *pts.*
233 .. — .. 6 *at* 14*d. per Foot.*
2*d.* $\frac{1}{6}$ 233 = 1 *s.*
38 .. 10 = 2 *d.*
$\frac{1}{2}$ = 6 *Parts.*
2|0) 27|1 .. 10$\frac{1}{2}$
£13 .. 11 .. 10$\frac{1}{2}$ *Anſ.*

20. What is the Worth of 8 Squares of Glaſs, each meaſuring 4 feet 10 Inches long, and 2 Feet 11 Inches broad, at 4*d.* $\frac{1}{8}$ *per* Foot? *Anſ.* £1 .. 18 .. 9.

21. There are 8 Windows to be glazed, each meaſures 1 Foot 6 Inches wide, and 3 Feet in Height, how much will they come to at 7*d.* $\frac{3}{4}$ *per* Foot? *Anſ.* £1 .. 3 .. 3.

22. What is the Price of a Marble Slab whoſe Length is 5 Feet 7 Inches, and the Breadth 1 Foot 10 Inches, at 6*s.* *per* Foot? *Anſ.* £3 .. 1 .. 5.

MEASURING *by the* YARD SQUARE, *as* PAVIORS, PAINTERS, PLAISTERERS *and* JOINERS.

Note, *Divide the Square Feet by* 9, *and it will give the Number of Square Yards.*

EXAMPLES.

23. A Room is to be ceiled, whoſe Length is 74 Feet 9 Inches, and Width 11 Feet 6 Inches, what will it come to at 3*s.* 10*d.* $\frac{1}{2}$ *per* Yard? *Anſ.* £18 .. 10 .. 1

24. What will the paving of a Court-yard come to, at 4*d.* $\frac{3}{4}$ *per* Yard, the Length being 58 Feet 6 Inches, and Breadth 54 Feet 9 Inches?. *Anſ.* £7 .. – .. 10.

25. A Room painted 97 Feet 8 Inches about, and 9 Feet 10 Inches high, what does it come to at 2*s.* 8*d.* $\frac{3}{4}$ *per* Yard? *Anſ.* £14 .. 11 .. 1.

26. What is the Content of a Piece of Wainſcotting in Yards Square, that is 8 Feet 3 Inches long, and 6 Feet 6 Inches broad, and what will it come to at 6*s.* 7*d.* $\frac{1}{2}$ *per* Yard? *Anſ.* £1 .. 19 .. 5.

27. What will the Paving a Court-yard come to at 3*s.* 2*d.* *per* Yard, if the Length be 27 Feet 10 Inches, and the Breadth 14 Feet 9 Inches? *Anſ.* £7 .. 4 .. 5.

28. A Perſon has paved a Court-yard 42 Feet 9 Inches in Front, and 68 Feet 6 Inches in Depth, and in this he laid a Foot-way the Depth of the Court, of 5 Feet 6 Inches in Breadth: The Foot-way is laid with Purbeck Stone, at 3*s.* 6*d.* *per* Yard, and the reſt with Pebbles, at 3*s.* *per* Yard, what will the whole come to? *Anſ.* £49 .. 17 .. –.

29. What will the Plaiſtering a Ceiling, at 10*d.* *per* Yard, come to, ſuppoſing the Length 21 Feet 8 Inches, and the Breadth 14 Feet 10 Inches? *Anſ.* £1 .. 9 .. 9.

30. What will the Wainſcotting a Room come to, at 6*s.* *per* Square Yard, ſuppoſing the Heighth of the Room, (taking in the Cornice and Moulding) is 12 Feet 6 Inches, and the Compaſs 83 Feet 8 Inches, the three Window Shutters each 7 Feet 8 Inches, by 3 Feet 6 Inches, and the Door 7 Feet by 3 Feet 6 Inches, the Shutters and Door being worked on both Sides, is reckoned Work and Half Work? *Anſ.* £36 .. 12 .. 2 $\frac{1}{2}$.

MEASURING *by the* SQUARE *of* 100 *Feet, as* FLOORING, PARTITIONING, ROOFING, TYLING, &c.

EXAMPLES.

31. In 173 Feet 10 Inches in Length, and 10 Feet 7 Inches in Heighth of Partitioning, how many Squares? *Anſ.* 18 *Squares*, 39 *Feet*, 8 *Inches*, 10 *P.*

32. If a Houſe of 3 Stories, beſides the Ground Floor, was to be floored at £6..10..– *per* Square, and the Houſe meaſures 20 Feet 8 Inches, by 16 Feet 9 Inches, there are 7 Fire Places, whoſe Meaſures are two of 6 Feet, by 4 Feet 6 Inches each, two of 6 Feet by 5 Feet 4 Inches each, and two of 5 Feet 8 Inches, by 4 Feet 8 Inches, and the ſeventh of 5 Feet 2 Inches, by 4 Feet, and the Well-hole for the

Stairs is 10 Feet 6 Inches, by 8 Feet 9 Inches, what will the Whole come to? *Anſ.* £53..13..3 ¼.

33. If a Houſe meaſures within the Walls 52 Feet 8 Inches in Length, and 30 Feet 6 Inches in Breadth, and the Roof be of a true Pitch, what will it come to roofing, at 10*s.* 6*d. per* Square? *Anſ.* £12..12..11 ¾.

Note, *In Tyling, Roofing, and Slating, it is cuſtomary to reckon the Flat, and Half of any Building within the Wall, to be the Meaſure of the Roof of that Building, when the ſaid Roof is of a true Pitch,* i. e. *when the Rafters are ¾ of the Breadth of the Building; but if the Roof is more or leſs than the true Pitch, they meaſure from one Side to the other, with a Rod or String.*

16. What will the Tyling of a Barn coſt, at 25*s.* 6*d. per* Square, the Length being 43 Feet 10 Inches, and Breadth 27 Feet 5 Inches on the Flat, the Eave Boards projecting 16 Inches on each Side? *Anſ.* £24..9..5 ½.

MEASURING *by the* ROD.

Note, *Bricklayers always value their Work at the Rate of a Brick and a Half thick, and if the Thickneſs of the Wall is more or leſs, it muſt be reduced to that Thickneſs by this*

RULE. Multiply the Area of the Wall by the Number of Half-bricks the Thickneſs of the Wall is of; the Product, divided by 3, gives the Area.

EXAMPLES.

34. If the Area of a Wall be 4085 Feet, and the Thickneſs two Bricks and a Half thick, how many Rods doth it contain? *Anſ.* 25.

35. If a Garden Wall be 254 Feet round, and 12 Feet 7 Inches high, and 3 Bricks thick, how many Rods doth it contain? *Anſ.* 23 *Rods*, 136 *Feet.*

36. How many Square Rods are there in a Wall 62 ½ Feet long, 14 Feet 8 Inches high, and 2 ½ Bricks thick? *Anſ.* 5 *Rods*, 167 *Feet.*

37. If the Side Walls of an Houſe be 28 Feet 10 Inches in Length, and the Heighth of the Roof from the Ground 53 Feet 8 Inches, and the Gable (or triangular Part at Top) to riſe 42 Courſe of Bricks (reckoning 4 Courſe to a Foot.) Now, 20 Feet high is 2 ½ Brick thick, 20 Feet more, at 2 Bricks thick, 15 Feet 8 Inches more, at 1 ½ Brick thick, and the Gable at 1 Brick thick, what will the whole Work come to, at £5..16..– *per* Rod? *Anſ.* £48..13..5 ½.

Multiplying ſeveral Figures by ſeveral, and the Product to be produced in one Line only.

RULE. Multiply the Units of the Multiplicand by the Units of the Multiplier, ſetting down the Units of the Product, and carry the Tens; next multiply the Tens in the Multiplicand by the Units of the Multiplier, to which add the Product of the Units of the Multiplicand multiplied by the Tens in the Multiplier, and the Tens carried; then multiply the Hundreds in the Multiplicand by the Units of the Multiplier, adding the Product of the Tens in the Multiplicand multiplied by the Tens in the Multiplier, and the Units of the Multiplicand by the Hundreds in the Multiplier; and ſo proceed till you have multiplied the Multiplicand all through, by every Figure in the Multiplier.

EXAMPLES.

Multiply -- 35234
by -- 52424

1847107216

35234
52424

140936
70468
140936
70468
176170

1847107216

EXAMPLES.

Firſt, $4\times4=16$, that is, 6 and carry 1. *Second*, $3\times4+4\times2$, and 1 that was carried is 21, ſet down 1 and carry 2. *Thirdly*, $2\times4+3\times2+4\times4+2$ carried $=32$, that is, 2 and carry 3. *Fourthly*, $5\times4+2\times2+3\times4+4\times2+3$ carried $=47$, ſet down 7 and carry 4. *Fifthly*, $3\times4+5\times2+2\times4+3\times2+4\times5+4$ carried $=60$, ſet down 0 and carry 6. *Sixthly*, $3\times2+5\times4+2\times2+3\times5+6$ carried $=51$, ſet down 1 and carry 5. *Seventhly*, $3\times4+5\times2+2\times5+5$ carried $=37$, that is 7 and carry 3. *Eighthly*, $3\times2+5\times5+3$ carried $=34$, ſet down 4, and carry 3. *Laſtly*, $3\times5+3$ carried $=18$ which being multiplied by the laſt Figure in the Multiplier, ſet the whole down, and the Work is finiſhed.

THE

Guillaume Francis

THE TUTOR's ASSISTANT.

PART V.

A Collection of QUESTIONS *ſet down promiſcuouſly, for the greater Trial of the foregoing* RULES.

WRITE down two Millions, five Hundred and two Thouſand, two Hundred and five.

2. What is the Value of 14 Barrels of Soap, at 4*d.* ½ *per lb.* each Barrel containing 254 *lb.?*

Anſ. £66..13..6.

3. If £100 Principal gain £5 Intereſt in 12 Months, what Principal will gain £20 in 8 Months?

Anſ. £600.

4. What Number is that from which, if the Square of 14 is deducted, and to the Remainder the Square of 12 be added, the Sum will be 250? *Anſ.* 302.

5. *A* and *B* trade together; *A* put in £320 for 5 Months, *B* £460 for 3 Months, and they gained £100, what muſt each Man receive? *Anſ.* A £53..13..9, $\frac{270}{298}$ *and* B £46..6..2, $\frac{28}{298}$.

6. How many Yards of Cloth, at 17*s.* 6*d. per* Yard, can I have for 13 *cwt.* 2 *qrs.* of Wool, at 14*d. per lb.?*

Anſ. 100 *Yards,* 3 *qrs.* $\frac{1}{5}$

7. What Number added to the Cube of 21, will make the Sum equal to 113 Times 147? *Anſ.* 7350.

8. If I buy 1000 Ells of *Flemiſh* Linen for £90, what may I ſell it at *per* Ell in *London,* to gain £10 by the Whole?

Anſ. 3*s.* 4*d. per Ell.*

9. *A* has 648 Yards of Cloth, at 14*s. per* Yard, ready Money, but in Barter will have 16*s.* *B* has Wine at £42 *per* Tun, ready Money, the Queſtion is, how much Wine muſt be given for the Cloth, and what is the Price of a Tun of Wine in Barter? *Anſ.* £48 *the Tun, and* 10 *Tun* 3 *Hogſhead,* 12 *Gallons of Wine muſt be given for the Cloth.*

10. A Jeweller ſold Jewels to the Value of £1200 for which he received in Part 876 *French* Piſtoles, at 16*s.* 6*d.* each, what Sum remains unpaid? *Anſ.* £477..6..–.

11. An Oilman bought 417 *cwt.* 1 *qr.* 15 *lb.* Groſs Weight of Train Oil, Tare 20 *lb. per* 112 *lb.* how many neat Gallons were there, allowing 7 $\frac{1}{2}$ *lb.* to a Gallon? *Anſ.* 5120 *Gallons.*

12. Bought threeſcore Pieces of Holland for three Times as many Pounds, and ſold them again for 4 Times as much; but if they had coſt me as much as I ſold them for, what ſhould I have ſold them for to gain after the ſame Rate? *Anſ.* £320.

13. What Number taken from the Square of 54 will leave 19 Times 46? *Anſ.* 2042.

14. If I buy a Yard of Cloth for 14*s.* 6*d.* and ſell it for 16*s.* 9*d.* what do I gain *per Cent?* *Anſ.* £15..10..4, $\frac{24}{174}$.

15. Bought 27 Bags of Ginger, each weighing Groſs 84 *lb.* $\frac{3}{4}$, Tare 1 *lb.* $\frac{3}{8}$ *per* Bag, Trett, 4 *lb. per* 104 *lb.* what do they come to at 8*d.* $\frac{1}{2}$ *per lb.?* *Anſ.* £76..13..3 $\frac{1}{2}$.

16. If $\frac{2}{3}$ of an Ounce coſt $\frac{7}{8}$ of a Shilling, what will $\frac{5}{6}$ of a *lb.* coſt? *Anſ.* 17*s.* 6*d.*

17. If $\frac{5}{6}$ of a Gallon coſt $\frac{5}{8}$ of a £. what will $\frac{5}{9}$ of a Tu coſt? *Anſ.* £105.

18. A young Man received £210, which was $\frac{2}{3}$ of his elder Brother's Portion; now three Times the elder Brother's Portion was Half of the Father's Eſtate, I demand how much the Eſtate was? *Anſ.* £1890.

19. If the Salary of an Officer be £48,5 *per Annum,* what muſt he receive for 232 Days? *Anſ.* £30..16..6, 2 *qrs.*

20. A Gentleman ſpends, one Day with another £1..7..10 $\frac{1}{2}$, and at the Year's End layeth up £340, what is his yearly Income? *Anſ.* £848..14..4 $\frac{1}{2}$.

21. A Lady's Fortune conſiſted of a Cabinet, worth £200, containing 16 Drawers, each having two Partitions, each of which contained £37 and two Crowns, pray what was her Portion? *Anſ.* £1400.

22. *A* has 13 Fother of Lead to ſend Abroad, each being 19 $\frac{1}{2}$ Times 112 *lb.* *B* has 39 Caſks of Tin, each 388 *lb.* how many Ounces Difference is there in the Weight of theſe Commodities? *Anſ.* 212160.

23. A Captain and 160 Sailors took a Prize worth £1360, of which the Captain had $\frac{1}{5}$ for his Share, and the reſt was equally divided among the Sailors, what was each Man's Part? *Anſ The Captain had* £272, *and each Sailor* £6..16..–.

24. What Number is that, to which if you add 7 $\frac{2}{3}$, the Whole will be 12 $\frac{1}{4}$? *Anſ.* 4 $\frac{7}{12}$.

25. A Uſurer put out £75 for 12 Months, and received for Principal and Intereſt, £81. I demand at what Rate *per Cent.* he received Intereſt? *Anſ.* £8 *per Cent.*

26. What will £956 amount to in $7\frac{1}{2}$ Years, at 5 *per Cent.* Simple Intereſt? *Anſ.* £1314..10..–.

27. At what Rate *per Cent.* will £956 amount to £1314 10*s.* in $7\frac{1}{2}$ Years, at Simple Intereſt? *Anſ.* 5 *per Cent.*

28. If for £1..4..– I have 1200 *lb.* Weight carried 36 Miles, how many *lb.* Weight can I have carried 24 Miles for the ſame Money? *Anſ.* 1800 *lb.*

29. If 8 Cannons in one Day ſpend 48 Barrels of Powder, I demand how many Barrels 24 Cannons will ſpend in 22 Days? *Anſ.* 3168.

30. What Number is that, which being multiplied by $\frac{2}{3}$, will produce $\frac{1}{4}$? *Anſ.* $\frac{3}{8}$.

31. *T* has 24 Cows worth 72*s.* each, and *B* 7 Horſes worth £13 a piece, how much will make good the Difference, in Caſe they interchange their ſaid Drove of Cattle? *Anſ.* £4 . 12 .. –.

32. A Man dies and leaves £120 to be given to 3 Perſons, *viz.* *A*, *B*, and *C*: to *A* a Share unknown; *B* twice as much as *A*, and *C* as much as *A* and *B*, what was the Share of each? *Anſ.* A £20, B £40, *and* C £60.

33. A Perſon dying, left his Widow £1780, and £1250 to each of his four Children; he had been $25\frac{1}{2}$ Years in Trade, and had cleared (at an Average) £126 a Year, what had he to begin with? *Anſ.* £3567.

34. There is a Sum of £1000 to be divided among 3 Men, in ſuch Manner, that if *A* has £3, *B* ſhall have 5, and *C* £8, how much muſt each Man have?
Anſ. A £187..10..–, B £312..10..–, *and* C £500.

35. A Piece of Wainſcot is 8 Foot 6 Inches and $\frac{1}{2}$ long, and 2 Feet 9 Inches $\frac{3}{4}$ broad, what is the Superficial Content? *Anſ.* 24 Feet 0.. 3″..4..6.

36. How many Changes may be rung on 6 Bells? *Anſ.* 720.

37. A Merchant at *Amſterdam* is indebted to another in *London*, in £642, and would pay it in *Spaniſh* Guilders, at 2*s per* Piece, how many muſt the *Engliſh* Merchant receive? *Anſ.* 6420.

38. If 360 Men be in Garriſon, and have Proviſion for 6 Months; but hearing of no Relief at the End of 5 Months, how many Men muſt depart, that the Proviſions may laſt ſo much longer? *Anſ.* 288 *Men.*

39. The leſs of two Numbers is 187, their Difference 34, the Square of the Product is required? *Anſ.* 1707920929.

40. A Butcher ſends his Man with £216 to a Fair to buy Cattle; Oxen at £11; Cows at 40*s*; Colts at £1..5..–, and

Hogs at £1..15..– *per* Piece, and of each a like Number, how many of each Sort did he buy ?
Anſ. 13 *of each Sort, and* £8 *over.*

41. What Number added to 11 $\frac{5}{7}$ will produce 36 $\frac{337}{616}$.
Anſ. 24 $\frac{513}{616}$

42. What Number multiplied by $\frac{3}{7}$ will produce 11 $\frac{9}{17}$.
Anſ. 26 $\frac{46}{51}$.

43. A Man had 12 Sons, the youngeſt was 3 Years old, and the eldeſt 58; they increaſed in Arithmetical Progreſſion, what was the common Difference of their Ages? *Anſ.* 5 *Years.*

44. What is the Value of 179 Hogſheads of Tobacco, each weighing 13 *cwt.* at £2..7..1 *per cwt.?* *Anſ.* £5478..2..11.

45. My Factor ſends me Word he has bought Goods to the Value of £500..13..6 upon my Account, what will his Commiſſion come to at 3 $\frac{1}{2}$ *per Cent ?* *Anſ.* £17..10..5. 2 *qrs.* $\frac{68}{100}$.

46. Miſs *Kitty* told her Siſter *Charlotte*, whoſe Father had before left them £13200 apiece; that their Grandmother by Will had raiſed her Fortune to £15000, and had made her own £20,000, what did the old Lady leave them? *Anſ.* £8600.

47. A Snail in getting up a May-Pole, only 20 Feet high, was obſerved to climb 8 Feet every Day, but every Night he came down again 4 Feet; in what Time, by this Method, did he reach the Top of the Pole ? *Anſ.* 4 *Days.*

48. If the $\frac{1}{3}$ of 6 be 3, what will $\frac{1}{4}$ of 20 be ? *Anſ.* 7 $\frac{1}{2}$.

49. What is the Difference between 14676, and the Fourth of itſelf ? *Anſ.* 11007.

50. There is in 3 Bags the Sum of £1468, *viz.* in the firſt Bag £461, in the ſecond £581, what was in the third Bag ? *Anſ.* £426.

51. What is the Decimal of 3 *qrs.* 14 *lb.* of an *cwt ?* *Anſ.* ,875.

52. How many *lb.* of Sugar, at 4*d.* $\frac{1}{2}$ *per lb.* muſt be given in Barter for 60 Groſs of Incle, at 8*s.* 8*d.* *per Groſs ?*
Anſ. 1386 $\frac{2}{3}$.

53. If I buy Yarn for 9*d.* the *lb.* and ſell it again for 13*d.* $\frac{1}{2}$ *per lb.* what is the Gain *per Cent.* ? *Anſ.* £50.

54. A Tobacconiſt would mix 20 *lb.* of Tobacco, at 9*d.* *per lb.* with 60 *lb.* at 12*d.* *per lb.* 40 *lb.* at 18*d.* the *lb.* and with 12 *lb.* at 2*s.* *per lb.* what is a *lb.* of this Mixture worth ?
Anſ. 1*s.* 2*d.* $\frac{1}{4}$ $\frac{9}{11}$.

55. What is the Value of 14 Barrels of Soap, at 4*d.* $\frac{1}{2}$ *per lb.* each Barrel, containing 254 *lb.* ? *Anſ.* £66..13..6.

56. Two Perſons, *A* and *B*, owe ſeveral Debts; the leſſer Debt being that of *A*, is £2173, the Difference is £371, what is the Debt of *B* ? *Anſ.* £2544.

57. What is the Difference between twice eight and twenty and twice twenty eight? As alſo, between twice five and fifty, and twice fifty-five? *Anſ.* 20 *and* 50.

58. What Number taken from the Square of 54 will leave 19 Times 46? *Anſ.* 2042.

59. A Schoolmaſter being aſked how many Scholars he had, ſaid, if I had as many more, half as many, and 1 Quarter as many, I ſhould have 99, how many had he? *Anſ.* 36.

60. An Ancient Lady being aſked how old ſhe was, to avoid a direct Anſwer, ſaid, I have 9 Children, and there are 3 Years between the Birth of each of them, the eldeſt was born when I was 19 Years old, which is now exactly the Age of the Youngeſt, how old was the Lady? *Anſ.* 62 *Years old.*

61. What Number is that which being added to 168 makes the Sum to be 706? *Anſ.* 538.

62. From £100 borrowed, take 72 paid;
'Twas a Virgin that lent it, what's due to the Maid?
Anſ. £28.

63. If when Wheat is 4*s.* *per* Buſhel, the 20 Penny Loaf weighs 18 *lb.* what muſt the ſaid 20 Penny Loaf weigh, when Wheat is 6*s.* the Buſhel? *Anſ.* 12 *lb.*

64. Whereas a Noble and a Mark juſt 15 Yards did buy, How many Ells of the ſame Cloth for £50 had I? *Anſ.* 600.

65. A Broker bought for his Principal in the Year 1720, £400 Capital Stock in the South Sea, at £650 *per Cent.* and ſold it again when it was worth but 130 *per Cent.* how much was loſt in the Whole? *Anſ.* £2080.

66. What Number added to the 43d Part of 4429, will make the Sum 240? *Anſ.* 137.

67. What Number deducted from the 26th Part of 2262 will leave the 87th Part of the ſame? *Anſ.* 61.

68. A Gentleman went to Sea at 17 Years of Age, 8 Years after that, he had a Son born who lived 46 Years, and died before his Father, after whom the Father lived twice 20 Years, and then died alſo, what was the Age of the Father when he died? *Anſ.* 111 *Years.*

69. *C* hath Candles at 6*s.* *per* Dozen ready Money, but in Barter will have 6*s.* 6*d.* *per* Dozen, *D* hath Cotton at 9*d.* *per lb.* ready Money, I demand what Price the Cotton muſt be at in Barter, alſo how much Cotton muſt be bartered for 100 Doz. of Candles? *Anſ. the Cotton* 9*d.* 3 *qrs. per lb. and* 7 *cwt.* 0 *qrs.* 16 *lb. of Cotton muſt be given for* 100 *Doz. of Candles.*

70. The Sum of two Numbers is 360, the leſs 114, what is their Difference, Product and larger Quote?

Anſ. 132 *Diff.* 28044 *Product,* $2\frac{3}{19}$ *Quote.*

71. A Brigade of Horſe, conſiſting of 384 Men, is to be formed into a Square Body, having 32 Men in Front, how many Ranks will there be? *Anſ.* 12.

72. If a Clerk's Salary be £73 a Year, what is that *per* Day? *Anſ.* 4*s.*

73. *B* hath an Eſtate of £53 *per Annum*, and payeth 5*s.* 10*d.* to the Subſidy, what muſt *C* pay, whoſe Eſtate is worth £100 *per Annum*? *Anſ.* 11*s.* 0*d.* $\frac{4}{53}$.

74. If I buy 100 Yards of Ribband at 3 Yards for a Shilling, and 100 more at 2 Yards for a Shilling, and ſell it at the Rate of 5 Yards for 2 Shillings, whether do I get or loſe, and how much? *Anſ. loſe* 3*s.* 4*d.*

75. What is the Value of $\frac{5}{8}$ of 20*s.*? *Anſ.* 12*s.* 6*d.*

76. What Number is that, which if you take $\frac{3}{5}$, the Remainder will be $\frac{1}{8}$? *Anſ.* $\frac{20}{40}$.

77. My Purſe and Money, quoth *Dick*, are worth 12*s.* 8*d.* but the Money is worth 7 of the Purſe, pray what is the Sum therein? *Anſ.* 11*s.* 1*d.*

68. What Number is that which maketh 9 to be the $\frac{2}{3}$ of it? *Anſ.* 13 $\frac{1}{2}$.

79. A Malſter has ſeveral Sorts of Malt, one at 4*s.* 6*d.* another at 4*s.* and a third at 3*s.* 6*d.* a Buſhel; to mix an equal Quantity of each, what muſt be the Price of a Buſhel? *Anſ.* 4*s.*

80. A Farmer is willing to make a Mixture of Rye at 4*s.* a Buſhel, Barley at 3*s.* and Oats at 2*s.* how much muſt he take of each to ſell it at 2*s.* 6*d.* the Buſhel? *Anſ.* 6 *of Rye*, 6 *of Barley, and* 24 *of Oats.*

81. If $\frac{3}{8}$ of a Ship be worth £3740, what is the Worth of the whole? *Anſ.* £9973..6..8.

82. A Perſon ſaid he had 20 Children, and that it happened there was a Year and a Half between each of their Ages, his eldeſt was born when he was 24 Years old, and the Age of his youngeſt is 21, what was the Father's Age? *Anſ.* 73 $\frac{1}{2}$ *Years.*

83. Bought a Caſk of Wine for £62..8..–, how many Gallons were in the ſame, when a Gallon was valued at 5*s.* 4*d.* *Anſ.* 234.

84. *B* owes *C* £296..17..–, but he compounds for 7*s.* 6*d.* in the Pound, what muſt *C* receive for his Debt? *Anſ.* £111..6..4 $\frac{1}{2}$.

85. How many Dozen of Stockings at 11 Groats *per* Pair, may I buy for £190..12..–? *Anſ.* 86 *Doz.* 7 *Pair* $\frac{28}{44}$.

86. A Sheepfold was robbed 3 Nights ſucceſſively; the firſt Night half the Sheep were ſtolen, and half a Sheep more;

the ſecond Night half of the Remainder were loſt, and half a Sheep more; the laſt Night they took half that were left, and half a Sheep more; by which Time they were reduced to 20; how many were they at firſt? *Anſ.* 167.

87. The Spectator's Club of fat People, tho' it conſiſted but of 15 Perſons, is ſaid to weigh no leſs than 3 Tons, how much, at an Equrality, was that *per* Man? *Anſ.* 4 *cwt.*

88. A merry young Fellow in a ſmall Time got the better of $\frac{1}{5}$ of his Fortune; by Advice of his Friends, he gave £2200 for an Exempt's Place in the Guards; his Profuſion continued till he had no more than 880 Guineas left, which he found by Computation was $\frac{3}{20}$ Part of his Money, after the Commiſſion was bought, pray what was his Fortune at firſt? *Anſ.* £10450.

89. *B* owes *C* £395..18..–, but compounds the whole Debt for £100..12..–, what is that in the Pound?

Anſ. 5*s.* 0*d.* $\frac{3}{4}\frac{7446}{7918}$.

90. How many Dollars, at 4*s.* 4*d.* each muſt be given for 360 Guilders, at 2*s.* 2*d.* each? *Anſ.* 180.

91. Four Men have a Sum of Money to be divided amongſt them in ſuch a Manner, that the firſt ſhall have $\frac{1}{3}$ of it, the ſecond $\frac{1}{4}$, the third $\frac{1}{6}$, and the fourth the Remainder, which is 28, what is the Sum? *Anſ.* £112.

92. What is the Amount of £1000 for 5 Years $\frac{1}{2}$, at 4 $\frac{3}{4}$ *per Cent.* Simple Intereſt? *Anſ.* £1261..5..–

93. Sold Goods amounting to the Value of £700 for 2 4 Months, what is the preſent Worth, at 5 *per Cent.* Simple Intereſt? *Anſ.* £682..19..5. 2 *qrs.*

94. A Room 30 Feet long, and 18 Feet wide, is to be covered with painted Cloth, how many Yards of $\frac{3}{4}$ wide will cover it? *Anſ.* 80 *Yards.*

95. There are two Numbers, the one 48, the other twice as much, what is the Difference between their Sum and Difference? *Anſ.* 96.

96. *Hetty* told her Brother *George*, that tho' her Fortune on her Marriage took £19312 out of her Family, it was but $\frac{3}{5}$ of two Years Rent, Heaven be praiſed! of his yearly Income; pray what was that? *Anſ.* £16093..6.. 8 *a Year.*

97. There are two Nnmbers, the one 25, the other the Square of 25, I demand the Square Root of the Sum of their Squares? *Anſ.* 625,4998.

98. Says *B* to *C*, if I had 4 of your Sheep, I ſhould have as many as you; and ſays *C* to *B*, if I had 4 of yours, I ſhould have twice as many as you; how many had each?

Anſ. B 20, C 28.

99. *B*, *C* and *D* trading together gained £120, which is to be ſhared according to each Man's Stock; *B* put in £140, *C* £300, and *D* £160, what is each Man's Share? *Anſ.* B £28, C £60, D £32.

100. A Gentleman having 50*s.* to pay amongſt his Labourers for a Day's Work, would give to every Boy 6*d.* to every Woman 8*d.* and to every Man 16*d.* the Number of Boys, Women and Men, was the ſame, I demand the Number of each? *Anſ.* 20 *of each Sort.*

101. There are 3 Numbers, 17, 19 and 48, I demand the Difference between the Sum of the Squares of the firſt and laſt, and the Cube of the Middlemoſt? *Anſ.* 4266.

102. A Stone that meaſures 4 Feet 6 Inches long, 2 Feet 9 Inches broad, and 3 Feet 4 Inches deep, how many ſolid Feet doth it contain? *Anſ.* 41 *Feet*, 3 *Inches.*

103. What does the whole Pay of a Man of War's Crew of 640 Sailors amount to for 32 Months Service, each Man's Pay being 22*s.* 6*d.* *per* Month? *Anſ.* £23040.

104. If I have an Eſtate of £470 *per Annum*, what may I expend daily, and yet lay up £130 *per Annum*? *Anſ.* 18*s.* 7*d.* $\frac{1}{2}$ $\frac{90}{365}$.

105. What Number is that, which being divided by 19, the Quotient will be 72? *Anſ.* 1368.

106. Reduce 13 $\frac{1}{2}$ Buſhels of Coals to the Fraction of a Chaldron. *Facit* $\frac{3}{8}$.

107. Bought 28 *qrs.* 2 Buſhels of Wheat at 4*s.* 6*d.* *per* Buſhel, what does it come to? *Anſ.* £50..17..–.

108. How many Pounds of Coffee at 5*s.* 9*d.* *per lb.* is equal in Value to 426 *lb.* of Tea at 13*s.* 4*d.* *per lb.*? *Anſ.* 987 $\frac{57}{69}$.

109. What is the Value of 27 Dozen 10 *lb.* of Candles at 5*d.* *per lb.*? *Anſ.* £6..19..2.

110. A Traveller would change 500 *French* Crowns at 4*s.* 6*d.* *per* Crown into *Sterling* Money, but he muſt pay a Halfpenny *per* Crown for Change, how much muſt he receive? *Anſ.* £111..9..2.

111. There are two Numbers, the one 63, and the other $\frac{1}{2}$ as much, I demand the Product of their Squares, and the Difference of their Product and Sum?

Anſ. Product of their Squares 3938240,25, *Difference* 1890.

112. *B* and *C* traded together, and gained £100; *B* put in £640, *C* put in ſo much, that he might receive £60 of the Gain. I demand how much *C* put in? *Anſ.* £960.

113. Of what Principal Sum did £20 Intereſt ariſe in 1 Year, at the Rate of 5 *per Cent. per Annum?* *Anſ.* £400.

114. Having bought 40 Yards of Cloth, at 8*s.* *per* Yard, and 70 Yards at 12*s.* what is the Value of both Pieces? *Anſ.* £58.

115. Two Men depart both from one Place, the one goes North, and the other South; the one goes 7 Miles, and the other eleven Miles a Day, how far are they diſtant the 12th Day of their Departure? *Anſ.* 216 *Miles.*

116. In 672 *Spaniſh* Guilders of 2*s.* each, how many *French* Piſtoles at 17*s.* 6*d.* *per* Piece? *Anſ.* $76\frac{28}{35}$.

117. In 7 Cheeſes, each weighing 1 *cwt.* 2 *qrs,* 5 *lb.* how many Allowances for Seamen may be cut, each weighing 5 *oz.* 7 *dr.?* *Anſ.* $3563\frac{35}{87}$.

118. If 48 taken from 120 leave 72, and 72 taken from 91 leave 19, and 7 taken from thence leave 12, what Number is that, out of which, when you have taken 48, 72, 19, and 7 leaves 12? *Anſ.* 158.

119. A Farmer ignorant in Numbers, ordered £500 to be divided among his 5 Sons, thus, Give *A*, ſays he, $\frac{1}{3}$, *B* $\frac{1}{4}$, *C* $\frac{1}{5}$, *D* $\frac{1}{6}$, and *E* $\frac{1}{7}$ Part, divide this equitable among them, according to the Father's Intention. *Anſ.* A £$152\frac{1392}{2754}$, B £$114\frac{1044}{2754}$, C £$91\frac{1386}{2754}$, D £$76\frac{696}{2754}$, *and* E £$65\frac{996}{2754}$.

120. When firſt the Marriage Knot was ty'd,
Between my Wife and me,
Her Age did mine as far exceed,
As three Times three does three.
But when ſeven Years, and half ſeven Years,
We Man and Wife had been,
My Age, came then as near to her's,
As Eight is to Sixteen.

Queſt. What was each of our Ages when we married? *Anſ.* 10 $\frac{1}{2}$ *Years the Man,* 31 $\frac{1}{2}$ *the Woman.*

121. If 12 Oxen will eat 3 $\frac{1}{3}$ Acres of Graſs in 4 Weeks, and 21 Oxen will eat 10 Acres in 9 Weeks, how many Oxen will eat 24 Acres in 18 Weeks, the Graſs being allowed to grow uniformly? *Anſ.* 36.

122. A Lady was aſked her Age, who reply'd thus,
My Age if multiplied by three,
Two Sevenths of that Product tripled be.
The Square Root of two Ninths of that is Four;
Now, tell my Age or never ſee me more.

Anſ. 28 *Years.*

A TABLE for finding the INTEREST of any Sum of Money for any Number of Months, Weeks, or Days, at any Rate per Cent.

Year.	Kalendar Month			Week.			Day.		
£.	£.	*s.*	*d.*	£.	*s.*	*d.*	£.	*s.*	*d.*
1	—	1	8	—	—	4½	—	—	—½
2	—	3	4	—	—	9 -	—	—	1¼
3	—	5	-	—	1	1¾	—	—	2 -
4	—	6	8	—	1	6¼	—	7	2½
5	—	8	4	—	1	11 -	—	—	3¼
6	—	10	-	—	2	3¾	—	—	3¾
7	—	11	8	—	2	8¼	—	—	4½
8	—	13	4	—	3	—¾	—	—	5½
9	—	15	-	—	3	5½	—	—	5¾
10	—	16	8	—	3	10 -	—	—	6½
20	1	13	4	—	7	8¼	—	1	1 -
30	2	10	-	—	11	6¼	—	1	7¾
40	3	6	8	—	15	4½	—	2	2¼
50	4	3	4	—	19	2¾	—	2	8¾
60	5	—	-	1	3	—¾	—	3	3¼
70	5	16	8	1	6	11 -	—	3	10 -
80	6	13	4	1	10	9 -	—	4	4½
90	7	10	-	1	14	7¼	—	4	11¼
100	8	6	8	1	18	5½	—	5	5¾
200	16	13	4	3	16	11 -	—	10	11½
300	25	—	-	5	15	4½	—	16	5¼
400	33	6	8	7	13	10 -	1	1	11 -
500	41	13	4	9	12	3½	1	7	4½
600	50	—	-	11	10	9 -	1	12	10½
700	58	6	8	13	9	2¾	1	18	4¼
800	66	13	4	15	7	8¼	2	3	10 -
900	75	—	-	17	6	1¾	2	9	3¾
1000	83	6	8	19	4	7¼	2	14	9½
2000	166	13	4	38	9	2¾	5	9	7 -
3000	250	—	-	57	13	10 -	8	4	4½
4000	333	6	8	76	18	5½	10	19	2 -
5000	416	13	4	96	3	—¾	13	13	11½
6000	500	—	-	115	7	8¼	16	8	9 -
7000	583	6	8	134	12	3½	19	3	6½
8000	666	13	4	153	16	11 -	21	18	4¼
9000	750	—	-	173	1	6¼	24	13	1¾
10,000	833	6	8	192	6	1¾	27	7	11¼
20,000	1666	13	4	314	12	3½	54	15	10½
30,000	2500	—	-	576	18	5½	82	3	10 -

RULE, Multiply the Principal by the Rate per Cent. and the Number of Months, Weeks, or Days which is required, cut off two Figures on the Right-hand Side of the Product, and collect from the Table the ſeveral Sums againſt the different Numbers as when added, will make the Number remaining. Add the ſeveral Sums together, it will give the Intereſt required.

N. B. For every 10 that is cut off in Months, add 2d. for every 10 cut off in Weeks, add an Halfpenny; and for every 40 in the Days, one Farthing.

1, What

EXAMPLES.

1. What is the Intereſt of £2467..10..– for 10 Months, at 4 *per Cent. per Annum?*

2467..10
4
9870..—
10
987|00

900 = 75..—..–
80 = 6..13..4
7 = —..11..8
987 = 82.. 5..–

2. What is the Intereſt of £2467..10..– for 12 Weeks, at 5 *per Cent.?*

2467. 10
5
12337. 0
12
1480|50. —

1000 = 19.. 4.. 7 ¼
400 = 7..13..10
80 = 1..10.. 6
–..—.. 2 ½
1480 = 28.. 9.. 4 ¾

3. What is the Intereſt of £2467..10..– for 50 Days, at 6 *per Cent?*

2467..10
6
14805..—
50
7402|50

7000 = 19..3.. 6 ½
400 = 1..1..11
2 = —..–.. 1 ¼
—..–..— ¼
7402 = 20..5.. 7

To find what any Eſtate from £1, to £60,000 *per Annum* will come to for 1 Day.

RULE. Collect the annual Rent or Income from the Table for one Year, againſt which take the ſeveral Sums for one Day, add them together it will give the Anſwer.

An Eſtate of £376 *per Annum*, what is that *pen* Day?

300 = –..16.. 5 ¼
70 = –.. 3..10
6 = –..—.. 3 ¾
376 = 1..—.. 7

To find the Amount of any Income, Salary, or Servant's Wages, ſor any Number of Months, Weeks, or Days.

Rule. Multiply the yearly Income or Salary by the Number of Months, Weeks, or Days, and collect the Product from the Table.

What will £270 *per Annum* come to for 11 Months, for 3 Weeks, and for 6 Days?

For 11 Months.

270 2000=166 .. 13 .. 4
11 900= 74 .. — .. –
—— 70= 5 .. 16 .. 8
2970 ——————
2970=247 .. 10 .. –

For 3 Weeks.

270 800=15 .. 7 .. 8¼
3 10=— .. 3 .. 10
—— ——————
810= 15 .. 11 .. 6¼

For 6 Days.

270 1000=2 .. 14 .. 9½
6 600=1 .. 12 .. 10½
—— 20=– .. 1 .. 1
1620 ——————
1620=4 .. 8 .. 9

For the whole Time.

247 .. 10 .. –
15 .. 11 .. 6¼
4 .. 8 .. 9
——————
267 .. 10 .. 3¼

A Table ſhewing the Number of Days from any Day in one Month to the ſame Day in any other Month, through the Year.

	From January.		February.		March		April.		May.		June.	
To	Feb.	31	March	28	April	31	May	30	June	31	July	30
	March	59	April	59	May	61	June	61	July	61	Aug.	61
	April	90	May	89	June	92	July	91	Aug.	92	Sept.	92
	May	120	June	120	July	122	Aug.	122	Sept.	123	Oct.	122
	June	151	July	150	Aug.	153	Sept.	153	Oct.	153	Nov.	153
	July	181	Aug.	181	Sept.	184	Oct.	183	Nov.	184	Dec.	183
	Aug.	212	Sept.	212	Oct.	214	Nov.	214	Dec.	218	Jan.	214
	Sept.	243	Oct.	242	Nov.	245	Dec.	244	Jan.	245	Feb.	245
	Oct.	273	Nov.	273	Dec.	275	Jan.	275	Feb.	276	Mar.	273
	Nov.	304	Dec.	303	Jan.	306	Feb.	306	Mar.	304	April	304
	Dec.	334	Jan.	334	Feb.	337	Mar.	334	April	335	May	334
	Jan.	365	Feb.	365	Mar.	365	April	365	May	365	June	365
	From July.		Auguſt.		September		October.		November		December.	
To	Aug.	31	Sept.	31	Oct.	30	Nov.	31	Dec.	30	Jan.	31
	Sept.	62	Oct.	61	Nov.	61	Dec.	61	Jan.	61	Feb.	62
	Oct.	92	Nov.	92	Dec.	91	Jan.	92	Feb.	92	Mar.	90
	Nov.	123	Dec.	122	Jan.	122	Feb.	123	Mar.	120	April	121
	Dec.	153	Jan.	153	Feb.	153	Mar.	151	April	151	May	151
	Jan.	184	Feb.	184	Mar.	181	April	182	May	181	June	182
	Feb.	215	Mar.	212	April	212	May	212	June	212	July	212
	Mar.	243	April	243	May	242	June	243	July	242	Aug.	243
	April	274	May	273	June	273	July	273	Aug.	273	Sept.	274
	May	304	June	304	July	303	Aug.	304	Sept.	304	Oct.	304
	June	335	July	334	Aug.	334	Sept.	335	Oct.	334	Nov.	335
	July	365	Aug.	365	Sept.	365	Oct.	365	Nov.	365	Dec.	365

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